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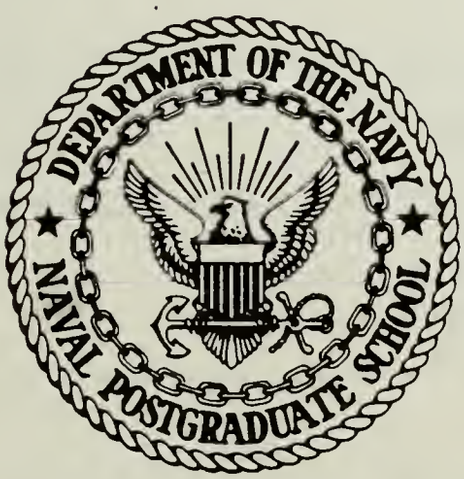

THESIS

LINKING THE APADE PROCUREMENT SYSTEM TO THE EDMICS RETRIEVAL NETWORK THROUGH SPLICE

by

Kevin Ross Carman
and
Edwin Neil Hart

June 1985

Thesis Advisor: Dean C. Guyer

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Linking the APADE Automated Procurement System to the EDMICS Data Retrieval Network Through SPLICE

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from the

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June 1985

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I. INTRODUCTION

A. FOCUS OF THE STUDY

The 98th Congress recognized the need for the military services and the Defense Logistics Agency (DLA) to automate technical data storage and retrieval capabilities to support major weapons systems in the 1985 Defense Authorization Act. This Act tasked the Secretary of Defense (SECDEF) to "develop a plan for an improved system for the management of technical data relating to any major system of the Department of Defense." [Ref. 1: p. 124] The 1985 Act further stated that SECDEF must address the following issues: [Ref. 1: pp. 124-125]

1. Indexing, storing, and updating items of technical data in a system.
2. Provide for timely access to complete and current technical data for authorized parties.
3. Developing a centralized system to identify the repository within the department responsible for technical data.

Technical data is defined as:

> graphic or pictorial delineations in media such as drawings or photographs; text in specifications, related performance or design type documents; in machine forms such as punch cards, magnetic tape, computer memory printouts; or may be retained in computer memory. Examples of technical data include research and engineering data, engineering drawings, technical reports, catalog item identifications, and related information. Technical data does not include financial, administrative, cost and pricing, and management data, or other information incidental to contract administration. [Ref. 2: p. 1]

Data are used to design, process, procure, support, maintain, or operate weapons systems, including the reprocurement of spare parts.

The Office of Secretary of Defense (OSD) was addressing the issue of technical data interface within and between the military services and DLA well before the Congressional mandate. In April 1984 an ad hoc group, under the Institute for Defense Analyses, was directed to develop a strategy and master plan for "automating weapons system support planning processes and data access to be fully integrated with Computer Aided Design and Manufacturing". [Ref. 3: p. 1] The goal was to take advantage of major advances by industry in Computer Aided Design (CAD), Computer Aided Engineering (CAE), and Computer Aided Manufacturing (CAM) for use by the military in the design, procurement, production, and support of major weapons systems.

While OSD and Congress investigate a long-range strategy that will allow technical data transfer among the services via a computer network, each service has several programs underway to ensure data is current, complete, accurate and readily accessable.

Technical data automation for the Navy is the responsibility of the Chief of Naval Material (NAVMAT), who is also responsible for multiple computer systems planned or already developed. NAVMAT recently tasked the Naval Supply Systems Command (NAVSUP) as the Lead Systems Command (SYSCOM) for the coordination of the automation of Navy technical data. The NAVSUP effort must ensure that hardware selection and software design result in a compatible network that reduces cost, improves response time, and eventually allows an interface with other services. [Ref. 4: p. 1] In addition, NAVSUP must move the Navy from a largely manual system that is reliant on hard copy to an automated system that can immediately retrieve data electronically.

To achieve the twin goals of compatibility and a paperless environment to generate, store, and distribute accurate data to the procurement, maintenance, and logistics

communities, NAVSUP initiated a project called Navy Standard Technical Information System (NSTIS), to monitor and control data automation efforts. NSTIS encompasses the following guidance:

1. Technical Information (TI) delivered to the Navy must be in a pre-determined format that is consistent with the capabilities of TI repositories. NAVMATINST 4000.15A provides specific guidance on format requirements to ensure that data is consistent with Public Law 96-511, the Paperwork Reduction Act. The Act requires data delivered by a contractor to be written in a format which will meet the administrative requirement that apply to acquisition contracts, project management, supply support, competitive procurements, and life cycle management.
2. There are several R & D efforts that will eventually become operational and NAVSUP must insure that they are consistent with the goals of NSTIS. The following are examples:
   a) Navy Technical Information Presentation System (NTIPS) is tasked to provide an integrated system to improve the definition, acquisition, updating and control of Navy technical manuals in support of all Naval Activities.
   b) Navy Automated Printing System (NAPS) has a short range task to provide print-on-demand capability for standard documents stored at Navy Publications and Forms Center (NPFC) and a long-range task for all documents stored at NPFC to be automated for a two-way system that user activities can access.
   c) Logistics Systems Information Network is tasked to automate the exchange of technical data within and between all DOD activities. [Ref. 4: p. 2]

3. Automation of technical data repositories is being accomplished through the Engineering Data Management Information and Control System (EDMICS) being developed and implemented by Naval Air Systems Command (NAVAIR) and will be the Navy's official system for the automated storage and retrieval of technical data. Once EDMICS becomes operational at the Aviation Supply Office (ASO), it will also be implemented by the Naval Sea Systems Command (NAVSEA), Naval Electronics Command (NAVELEX), Naval Supply Systems Command, and Defense Logistics Agency for use by their tenant activities (Naval Shipyards, Naval Air Rework Facilities, Naval Supply Centers/Depots, Naval Regional Contracting Centers, and various research and development laboratories). EDMICS will first automate key repositories now using aperture cards to store data, and ultimately allow direct access to each data base via remote computer terminals.
4. NAVSUP efforts must remain compatible and integrated with:
   a) CAD/CAM/CAE systems planned for the Navy.
   b) The Department of Defense (DOD) Inventory Control Points, in-service engineering activities, and the Navy maintenance activities so as to eliminate the need for redundant data repositories.
   c) The Navy's configuration status accounting system, including information maintained at the Weapons Systems Files (WSF's) at the Navy's inventory control points, Ship's Parts Control Center (SPCC) and ASO. [Ref. 5: p. 2]

While SECDEF's committee is developing a long-range strategy for improved logistics support through the use of CAD, CAM, and CAE and the various services are working on

short-range solutions to technical data storage and retrieval, NAVMAT is also dealing with a problem directly related to those programs--how to improve the acquisition and procurement of spare parts. Technical data accuracy has not received much attention in the past, but is now being recognized as a critical factor when competitive reprocurements are attempted.

For example, SPCC screened two hundred items from October 1982 to April 1983 under a program called Breakout. The program attempts to flag items currently labeled sole source but have the potential for being procured competitively. A 25 percent cost savings was predicted based on the items screened. However, technical data problems hindered progress. Among the two hundred items screened, 42 percent lacked sufficient documentation, fourteen percent were listed as having proprietary drawings, and 23 percent had no drawings at all to base a breakout decision. [Ref. 6: p. 13]

There are two initiatives being developed under NAVMAT direction to solve spare parts problems that have recently received media attention. One is Buy Our Spares Smart (BOSS), with over one hundred initiatives to improve the way spare parts are procured. Within BOSS, one of its key initiatives is the automation of technical data for use by the procurement community.

The second initiative is the development of a field-level procurement system called Automation of Procurement and Accounting Data Entry (APADE), which will automate the procurement process at the Navy's two inventory control points (ASO and SPCC), Naval Supply Centers/Depots, Naval Shipyards, Navy Regional Contracting Centers, and selected laboratories. APADE will be designed to alleviate much of the administrative workload and improve the time it takes to prepare a competitive solicitation.

B. OBJECTIVES

The objective of this thesis is to analyze possible improvements to the Navy procurement process through a networking and communications link between DOD technical data repositories and field level buying activities. Many of the BOSS initiatives will be discussed in support of the objective.

This thesis will first define the goals of BOSS, followed by a discussion of Automated Procurement and Data Entry, Stock Point Integrated Communication Environment (SPLICE), and Engineering Data Management Information Control systems. The potential integration of these systems to support the goals of BOSS will be discussed in Chapter VI, including a model to demonstrate how such a network could be structured.

C. RESEARCH QUESTIONS

To achieve the objective of the research, the following question was posed: How can current Department of Defense initiatives to automate technical data be tailored to support United States Navy objectives for improving spare parts acquisitions?

To answer the basic research question the following subsidiary questions were asked:

1. What is the nature of technical data automation efforts within Department of Defense and how do they relate to the objectives of the Naval Supply Systems Command's BOSS program?
2. What technical data is necessary to support BOSS?
3. How should APADE and EDMICS systems be networked to enhance field level procurement?

D. RESEARCH METHODOLOGY

During the initial stages of this thesis, an intensive review was conducted to determine the extent of research already accomplished in the area of technical data automation for the Department of Defense and the Unites States Navy.

Through the use of custom bibliographies, Congressional reports, cataloged reference material, General Accounting Office (GAO) reports, the Defense Logistics Studies Information Exchange (DLSIE), the Defense Technical Information Center (DTIC), business periodicals, the Naval Postgraduate School library and Defense Department reports; an adequate data base was established. Additionally, information utilized in this thesis was derived from interviews with various personnel at the Office of the Secretary of Defense, Naval Material Systems Command, Naval Supply Systems Command, Naval Supply Centers (NSC), Naval Regional Contract Centers (NRCC), Naval Shipyards (NSY), Shore Intermediate Maintenance Activities (SIMA), Inventory Control Points (ICP), and personnel in other procurement activities.

E. SCOPE OF STUDY

This particular research will be limited to the automation of technical data within the United States Navy as it applies to field procurement. Several closely related programs are already under development by the Navy to meet the needs of each SYSCOM (NTIPS, NAPS, LSIN, EDMICS are examples), but all have one common requirement--the ability to access current, accurate and complete technical data in a timely manner. This research effort will focus on the feasibility of linking field procurement activities (using SPLICE hardware) directly to technical data repositories.

The ultimate goal is to decrease the administrative workload and shorten the acquisition process by improving data access to a "...system that is twenty-five years behind in automating its storage and retrieval functions: [Ref. 7]

Policies affecting the development of a networking system internal and external to the Navy will be discussed, however, a detailed analysis of the overall Secretary of Defense strategy for an integrated system will not be addressed.

F. ASSUMPTIONS

Throughout this research report, it is assumed that the reader is familiar with Federal Acquisition Regulations (FAR) and has a basic understanding of the procurement process, understands data bases, technical data, contracting organizations and the use of technical data in Government contracting. Finally, the reader must have an understanding of the elementary aspects of computer systems.

G. ORGANIZATION OF THE STUDY

This thesis is organized to provide the reader with an examination of the problems associated with the automation of technical data, networking, and establishing a communication data link. It will be segregated into the following chapters.

Chapter I provides an introduction and an overview of technical data automation and its potential relationship with other SECDEF and Navy initiatives (BOSS, APADE, and EDMICS).

Chapter II discusses the Buy Our Spares Smart program, its development, and status.

Chapter III will discuss the Automated Procurement and Data Entry system, its history, systems configuration, APADE

Redesign, objectives, milestones and strategies and Project Management structure. This chapter will also include sections of the Air Force Base Accounting and Contracting System (BCAS) because the APADE system will adopt several of its functional aspects for the APADE redesign effort.

Chapter IV will discuss the Stock Point Logistics Integrated Communications System, its history, concepts, objectives, system requirements, implementation schedule, and project management structure.

Chapter V will discuss the Engineering Data Management Information Control System for the storage and retrieval of technical data.

Chapter VI will develop a model to link network field level activities with the EDMICS system.

Chapter VII will present the researchers' conclusions, recommendations, and and potential benefits of a network between APADE and EDMICS.

II. BUY OUR SPARES SMART (BOSS)

A. INTRODUCTION

The Buy Our Spares Smart (BOSS) program has been implemented by the Navy to attack spare parts procurement deficiencies. This chapter will first describe some of the circumstances that have lead to the development of Project BOSS, followed by some of the guidance provided by Congress in the form of legislation. Finally, the goals of Project BOSS will be discussed including its first year's results as reported to Congress in 1984.

B. BACKGROUND

1. History

The Department of Defense budget has grown from $178 billion in 1978 to a projected $419 billion in 1989 [Ref. 8: p. 52]. Even though the DOD budget is not as large as entitlement's and other mandatory programs such as Social Security, many Americans are concerned about the alleged waste and misuse of public funds. The procurement process has caught the attention of the general public and Congress through media coverage which exposed high prices DOD paid for common items such as claw hammers, diodes, coffee pots, and toilet seat covers. As a result, Congressional legislation has been introduced to attack the problems which cause excessive prices for spare parts. The following examples are provided.

a. Competition and Contracting Act of 1984

(1) Cost/Pricing Data. Contractors must submit cost and pricing data for procurements of $100,000 or greater. The old threshold was $500,000

(2) Sole Source Certification. Sole source buys are prohibited except when certified as necessary under one of the following conditions: (a) Only one source available; (b) Unusual or compelling urgency; (c) Industrial Mobilization Requirement; (d) International Agreement; (e) Experimental, Developmental or Research Work; (f) National Security Interests; (g) Authorized by Statute

(3) Annual Progress Report. DOD is now required to submit an annual report to Congress on progress achieved towards increasing competition. [Ref. 9: p. 4]

b. PL 98-525, Defense Authorization Act

(1) Parts to Manufacturer. Requires that all spare parts be identified to an actual manufacturer

(2) Unreasonable Restrictions. Prohibits prime contractors from unreasonably restricting contractors from selling directly to the government

(3) Data Rights. SECDEF is to issue regulations concerning time limits contractors are to retain data rights

(4) Revision of Personnel Evaluations. Civilian personnel evaluations are to emphasize competition and set targets to be achieved through the merit pay system

(5) Better Utilization of Federal Supply System. DOD must make better use of the federal supply system for standard stock, including the use of commercial items where feasible

(6) Use of Economic Order Quantities. Economic order quantities are to be used for spare parts procurements at every opportunity

(7) Qualified Bidders List. Bidders are not to be rejected just because they are not on a qualified bidders list

(8) Price Limits. Spare parts are to never be procured at a price higher than paid by commercial buyers for the same parts

(9) Technical Data Management. DOD must submit plans to Congress within one year for the management of technical data within each service, including a plan which allows an exchange of data between the services. [Ref. 10: p. 44]

c. PL98-577, Small Business and Federal Procurement Competition Act of 1984 [Ref. 10: p. 45]

(1) Small Business Breakout Representative. Established a Small Business Breakout representative at both Navy Inventory Control Points (ASO and SPCC)

2. Navy Lead in Technical Data Automation

Spare parts procurement deficiencies within the Navy have been addressed by the former Chief of Naval Material (NAVMAT) who tasked NAVSUP with coordinating a Navy-wide campaign to improve the way in which spare parts are procured--a plan called BOSS [Ref. 4: p. 1]. Project BOSS contains over one-hundred actions that will be discussed in this chapter, followed by a summary of NAVSUP's first annual report to Navy activities involved with the procurement process.

3. Key Players

Project BOSS affects every aspect of the procurement process, from major system acquisitions to small purchase. As a result, a project office was established (PML-550) to implement the goals of BOSS. In determining the extent of

the problem, PML-550 received input from the following activities: (1) Chief of Naval Material, Deputy Commander for Contract Management (MAT-02); (2) Ships Parts Control Center; (3) Aviation Supply Office; (4) Fleet Material Support Office (FMSO); (5) Navy Field Contract System (NFCS).

4. Overpriced Spare Parts

During FY 84 there were several audits performed by the DOD Inspector General (DODIG), General Accounting Office (GAO), Naval Audit Service (NAVAUDSVC), Office of Federal Procurement Policy (OFPP) and the House Appropriations Committee Surveys and Investigations (HAC(S & I)) staff. One of the purposes of such audits is to uncover discrepancies and have them corrected by the buying activity. The following are examples of the most common discrepancies noted:

1. Pricing deficiencies in the procurement process;
2. Lower prices available from other sources;
3. Uneconomical quantities purchased;
4. Supply system assets not utilized whenavailable;
5. Higher prices paid to fill urgent requirements;
6. Pricing methodology overstated the item value;
7. Procuring offices did not have the data readily available to obtain lower prices;
8. Insufficient, illegible, or otherwise inadequate technical data precluded competitive reprocurements;
9. Reluctance of some officials to seek competition;
10. Procurement personnel are not price conscious;
11. The material acquisition process is too clerical, with inadequate cost/price analysis for competition or negotiated.

[Ref. 10: p. 32]

5. Objectives

The overall objective of the Project BOSS program is to improve on deficiencies in the procurement system through enforcement of existing directives, as well as initiating new programs to obtain spare parts at a fair and reasonable price. All one-hundred actions can be summarized into basically three interdependent goals:

1. Breakout parts and equipment from prime contractors who add no value to the item;
2. Significantly increase the use of competitive procurement to purchase material and supporting services;
3. Declericalize the procurement process by reemphasizing existing procedures and creating new tools to provide better information to the buyers.

In order for NAVSUP to investigate and improve spare parts procurement practices in the Navy, $35 million was invested in Project BOSS, and 550 civilian billets added to the workforce in FY 84. In FY 85 the budget grew to $66 million and 185 additional billets were added. [Ref. 10: p. 7]

All one-hundred initiatives within BOSS contribute to the above three interdependent goals--Breakout, Competition, and Declericalization. A further breakdown of Project BOSS initiatives is provided.

a. Requirements Determination

This initiative has eight internal actions to review and improve the provisioning process since it is the first step in establishing prices for future buys.

(1) Review Contractor Support Packages. One of the steps undertaken was to eliminate common-use items from support packages provided by contractors. Many items

such as hand tools are provided with repair kits at excessive prices because of uneconomical quantities ordered and the uniqueness of the kit [Ref. 11: p. 4]. The Navy must change this practice and utilize the Navy supply system where possible. BOSS personnel are reviewing contractor-provided packages and purging unnecessary items from the package.

(2) Review Economic Order Quantity Models. Another goal is to review Economic Order Quantity (EOQ) models used by the SPCC and ASO so that small, repetitive buys are combined into a larger, more economical buy whenever possible.

b. Breakout

Breakout can be defined as a review of sole-source coded items to determine whether they can be obtained from a contractor other than the prime, either on a competitive basis or from the original equipment manufacturer (OEM). Due to limited resources and the extent of research required, a breakout candidate must cost $10,000 or greater in order to be cost effective. [Ref. 12: p. S6-304]

SPCC screened 2046 items in 1984 with a 54 percent breakout success. The original equipment manufacturer accounted for 14 percent, while 40 percent were successfully competed. ASO screened 3143 items with even better results--74 percent were actually broken out, 11 percent procured from the original manufacturer and 63 percent successfully competed. Breakout screens saved DOD $144.8M in cost avoidance in 1984 [Ref. 13: Enclosure (1)]. ASO and SPCC are planning to expand the program as a result of its initial success.

c. Competition

DOD policy has dictated maximum competition in Federal Government procurement. Almost every aspect of Project BOSS touches on competition in one way or another. The following are examples of competition initiatives undertaken through Project BOSS.

(1) Competition Goals. The Navy Field Contracting System (NFCS) required its 902 activities to have 42 percent competitive procurements in FY 84. ASO had a goal of 25 percent, while SPCC's goal was 35 percent. [Ref. 10: p. 21]

(2) Competition Advocate. A Competition Advocate was assigned to every command generating contract requirements over $1 million annually. The advocates job is to promote competition at every opportunity and personally review every procurement where a sole source buy is anticipated. To accomplish this goal, the advocate's set up review boards to screen and challenge every proposed sole source procurement.

(3) Competition Target Goals. Merit pay objectives were rewritten to include competition targets as part of the civilian evaluation system. Additionally, incentive awards were established/revised to encourage contributions toward increased competition.

(4) Industry Cooperation. Efforts were undertaken to obtain cooperation from industry in the form of letters and meetings with contractors urging support of this initiative.

(5) Promoting Government Business. Competition fairs were conducted by ASO and SPCC to increase industry participation in the procurement process. The fairs educated industry in government procurement procedures, the goals of competition, and how/why industry should get involved with government procurement.

(6) Small Business Opportunities. Six briefings were held in various Congressional districts on how small business can get involved with the government procurement process.

(7) Establishment of Hot Line. Local hot lines were established at many commands to answer inquiries on material procured locally and therefore, not covered by the FMSO pricing hotline.

d. Method of Procurement

This initiative dealt primarily with cost reduction techniques already available to procurement personnel but not implemented to the extent possible.

(1) Multi-year Procurement. Emphasis on multi-year procurement was stressed as a means of obtaining more than one year, but not more than five years requirements in a single procurement. The C2A aircraft developed by the Grumman Aircraft Corporation is the best example of how effective the multi-year concept can be applied. There are six criteria multi-year candidates must pass and only those truely deserving are considered. The main opponent of the multi-year concept is Congress since it obligates DOD to a long-term commitment, with severe financial penalties if the government decides to suddenly cancel the program.

(2) Foreign Military Sales. Another goal is combining spare parts procurements for Navy and Foreign Military Sales (FMS) into a single buy whenever possible. A procurement of this nature would eliminate duplicate start-up costs by allowing the government to buy via Economic Order Quantities (EOQ).

(3) Centralized Non-CASREP Section. SPCC is attempting to centralize a non-standard CASREP requisition section to research and expedite non-NSN part requirements, which traditionally experience long procurement delays.

e. Pricing and Price Surveillance

This initiative has twenty-seven goals primarily designed to research and investigate overpricing of spare parts. A program entitled Price Fighter has been set up in Norfolk, Virginia to accept telephone calls from any Naval activity to investigate items reported to be overpriced. The program received an average of 300 telephone calls per month in FY 84 and has successfully flagged many items that are overpriced. [Ref. 7]

f. Contract Management

A major goal within this initiative was to require a value engineering clause in all contracts where spare parts and repair kits costing $25,000 or greater for other than standard commercial parts [Ref. 11: p. 10]. Value engineering has two main goals. First, a review of unnecessary and overly complicated specifications is made by engineers and where applicable, data is revised to allow for a competitive procurement. Secondly, a value engineering review eliminates common-use items from kits that are readily available from commercial sources or the Navy Supply system.

g. Training

Renewed emphasis was placed in the area of training and many of the goals of Project BOSS were emphasized in training sessions. The following are examples of topics discussed:

(1) Pricing/Competition Training. Emphasis was placed on pricing and its relationship with competition during Contract Management Reviews (CMR). Training was conducted for procurement and technical personnel in the areas of cost/price analysis, specification/statement of

work preparation, data rights, breakout, procurement planning, consolidation of requirements and Procurement Management Reporting Systems (PMRS).

(2) Initial and Refresher Training. Initial and refresher training courses were emphasized under this initiative. Courses designed to detect fraud during CMR's, training/ qualification criteria for promotions for 1102/1105 series personnel, required semi-annual cost/price analysis courses, and the review of requirements for issuing warrants to contracting officers were stressed.

h. Automated Systems

This initiative is designed to increase the automation of the procurement process at Inventory Control Points, Stock Points (SP), and Naval Regional Contracting Centers (NRCC). It will address the issue of automating the administrative process via APADE and the automation of data repositories via EDMICS. These systems will be discussed in Chapters III and IV respectively.

i. Resources

Resources will be reallocated as necessary to reduce the administrative workload in meeting every BOSS initiative. Project BOSS had 550 personnel assigned in FY 84, 185 added in FY 85, with a total dollar investment of $66 million. [Ref. 10: p. 56]

6. Project BOSS Status Report for FY 84

Congress has mandated that all military services provide an annual report within one year of the 1984 Authorization Act on status achieved to improve the procurement process. Appendix E provides a summary of SECDEF initiatives and Navy action taken to correct deficiencies.

Table I provides a summary of cost avoidances in FY 1984 as a result of Project BOSS:

TABLE I

SUMMARY OF FY 1984 COST AVOIDANCES
($ Millions)

Full screen breakout to competition	$119.4
Limited screen breakout	35.4
Other competition at field activities	14.2
Redefinition of requirement	7.1
Spare Acquisition Integration with Production	15.9
PRICE FIGHTER	.5
Refunds	.5
Total cost avoidance	$193.0
Less FY 84 investment	35.1
Net cost avoidance	$157.9

Source: [Ref. 10: p. 74]

III. AUTOMATION OF PROCUREMENT AND ACCOUNTING DATA ENTRY (APADE)

A. BACKGROUND

The current contracting method used at the NSC's and NRCC's is characterized as labor-intensive and time consuming, requiring buyers and support personnel to perform identical or similar tasks on a recurring basis. The system lacks analytical tools and consists of vast amounts of paper. Improving the responsiveness of the procurement process through automation is an urgent need of the Navy, and in particular; those activities under the cognizance of the NAVSUP. In 1983, NFCS activities completed 3.02 million procurement actions with an obligational dollar value of $10.98 billion. A summary of the 1983 resources are shown in Table II [Ref. 14].

The Secretary of Defense issued thirty-two initiatives aimed at improving DOD's procurement process. One of these initiatives called for accelerated plans to acquire computer hardware and software to assist procurement personnel. Specifically, the Navy had to improve its method of buying by providing procurement personnel with automated tools. [Ref. 15: p. 11]

> The APADE project, initially targeted for the NSC's and NRCC's, will cover 16 percent of the actions and 20 percent of the dollars and the ICP procurement "Resystemization" will cover 5 to 6 percent of the procurement actions and 36 to 39 percent of the dollars expended. Anticipated exportation of APADE outside of the NAVSUP claimancy will further enhance this coverage to 44 percent of the actions and 48 percent of the dollars in NFCS. Table II provide the data based upon Fiscal Year 1983 data for twenty-two sites and the miscellaneous NFCS activities. [Ref. 16]

Based upon the trend, procurement automation initiatives will cover 50 percent of the procurement actions and 87 percent of the dollars expended by only thirty-six NFCS contracting activities by Fiscal Year 1986. The remaining actions and dollars are spread among the additional 795 activities within the NFCS.

The NFCS accounted for 83 percent of the Navy actions and 22 percent of the dollar value. The urgency to automate the manual procurement system is significant and growing [Ref. 17: p. iii]. Since 1978, an upward trend (10 to 15 percent per year) in the volume of procurement actions has occured. The upward trend in volume is expected to continue while resource constraints within the government and DOD are expected to preclude equivalent staffing to meet the increased workload. Additionally, the direct effect purchase performance has on fleet readiness and on the ability of shore activities to perform their support mission dictates that increased efficiency be obtained.

The automation of procurement commenced in 1966 with a pilot program at ASO which consisted of an automated ordering function integrated with financial and inventory control programs. Achelleas Kollios and Joseph Stempel documented the utilization of Electronic Data Processing (EDP) in the purchase function at ASO in their book, Purchasing and EDP. [Ref. 18: pp. 69-90]

NSC San Diego developed the Automated Local Purchase Support (ALPS) system in September 1969. This system consisted of three major data files which automated the purchase of controlled local purchase items and items under existing contracts. The major files consisted of a Federal Stock Number (FSN) file, Part Number (P/N) File, Suppliers Name and Address File and Automated Follow-up Program. This system assisted the buyer in cross referencing FSN and P/N, contract administration and contractor performance in the

TABLE II

NAVY FIELD CONTRACTING SYSTEM 1983 RESOURCES

ACTIVITY	# Actions	% TOTAL	$ Volume	% TOTAL
Inventory Control Points				
SPCC	92,344	3.1	1,487,076	13.5
ASO	51,124	1.7	2,441,408	22.2
TOTAL ICP	143,468	4.8	3,928,484	35.8
Regional Contracting Centers				
Philadelphia	41,290	1.4	774,683	7.1
Long Beach	27,099	0.9	362,480	3.3
Naples	10,074	0.3	29,463	0.3
Washington D. C.	21,371	0.1	212,834	1.9
TOTAL NRCC	80,812	2.7	1,379,460	12.6
Naval Supply Centers				
Pearl Harbor	65,061	2.2	63,519	0.6
Norfolk	95,815	3.2	184,117	1.7
Oakland	64,683	2.1	136,149	1.2
Puget Sound	45,935	1.5	132,218	1.2
Charleston	69,355	2.3	193,587	1.8
Jacksonville	17,922	0.6	27,500	0.3
San Diego	38,799	1.3	111,085	1.0
TOTAL NSC	397,570	13.2	848,298	7.7
Naval Supply Depot				
Guam	11,059	0.4	13,086	0.1
Subic Bay	18,186	0.6	86,983	0.3
Yokosuka	28,321	0.9	42,823	0.4
TOTAL NSD	57,566	1.9	142,892	0.8
Naval Laboratories				
NADC Warminster	10,473	0.3	171,026	1.6
NWC China Lake	34,832	1.2	147,220	1.3
NCSC Panama City	10,435	0.3	27,334	0.2
NSWS White Oak	44,302	1.5	226,209	2.1
NOSC San Diego	22,532	0.7	189,745	1.7
DTNSR&D Bethesda	22,923	0.8	67,182	0.6
TOTAL LABORATORIES	145,497	4.8	828,716	7.5
Miscellaneous NFCS Activities				
	2,191,071	72.6	3,904,282	35.6
TOTAL NFCS	3,015,984	100.0	10,982,132	100.0

Source: [Ref. 19: p. 3-7]

small purchase function. However, the system was not integrated with the technical or financial screening functions of the administrative process. [Ref. 20: p. 8]

In 1970, NSC Puget Sound developed the Automated Status of Purchase Information Recorded Electronically (ASPIRE) system. This local system was an attempt to create a totally integrated system. [Ref. 21: p. 125] NSC Charleston developed the Procurement Management Information System (PROMIS) which met in-house demands for procurement requirements. Several field level activities developed in-house systems to meet local demands. Each of the local systems attempt to support various areas where automation offers the greatest potential. These areas include buyer support, contract administrative support, management information, document production, report generation, and update of files, interface and communication with procurement support areas. None of these systems could be classified as a completely integrated procurement management information system. These systems fulfilled specific requirements demanded by the customers and serviced the needs of the field contracting activity, but none of these local systems could be adapted to other activities as an integrated system.

NAVSUP recognized the need for automation of procurement and designated FMSO as the Central Design Agency (CDA) for the development of a uniform automated data processing system for field level contracting. This initiative required FMSO to design procedures and programs that would integrate the fragmented programs of the various NFCS activities into a comprehensive, integrated management information system. The system was to be designed to support both levels of field contracting, ICPs and NSC/NRCC. Several issues made the concept beyond the scope of a comprehensive system and would require extensive effort to develop. Resources were

limited to research a single integrated system to meet the needs of each local activity. Each level had different requirements to be integrated into the system, making the single system concept infeasible. [Ref. 21: p. 125]

B. APADE I

In recognition of the need to automate the labor intensive procurement function, a research and development funded project (APADE I) was initiated at a pilot test site to determine the feasibility and cost effectiveness of converting the existing manual process of preparing formal procurement documents to an automated system utilizing a mini-computer, Data General NOVA 800. In this system, a typist would prepare Request for Proposals (RFP's), Invitations for Bids (IFB's), and Purchase Award documents on a display unit. The system was menu driven and provided programmed questions to complete the documents. Upon completion of the menu, the document was sent to the printer. Upon completion of the printing process, the document was reduced in size to be sent to the contractor.

APADE I met very limited success. However, the combination of the inputs from the local systems and data collected from the pilot program indicated that the potential existed for greater improvement in this area as well as in other labor intensive procurement functions.

As an outgrowth of the R & D project, NAVSUP and the FMSO reviewed locally developed purchase systems at various NFCS activities and other DOD contracting activities for possible standardization and exportation to the NFCS. These systems included the following:

1. PROMIS - NSC Charleston's Procurement Management Information System,

2. ASPIRE - NSC Puget Sound's Automated Status of Purchasing Information Recorded Electronically,
3. WANG System - NRCC Long Beach's Procurement System,
4. SAMMS - Defense Logistic Agency's Standard Automated Material Management System,
5. PADS - Department of the Army Readiness Command (DARCOM's) Procurement Automated Documentation System,
6. CIAPS - Air Force's Customer Integrated Automated Procurement System,
7. MOHAWK -an automated document productions system utilizing Data Science 21/50 System. This system is limited to producing purchase orders via real time or batch mode operation (NSC Norfolk, Va./Naval Air Station, Alameda, Ca./Naval Submarine Base, Groton, Ct.)

The following are commercial software/word processing/ hardware systems that were examined for possible application to the Navy Field Contracting System. These systems had capabilities for controlled job related functions to include document and editing research, formal printing, electronic mail/schedule bulletin board and word processing.

1. IBM Professional Office System (PROFS) Computer System,
2. WANG Data Processing and Word Processing "VS" System,
3. Xerox's 860 Word Processing System. [Ref. 17: p. 5]

None of these unique purchase systems was sufficiently comprehensive and exportation of any existing system was not feasible, even for the short term. [Ref. 22: pp. 47-48]

C. APADE II

As a result of efforts achieved in APADE I, the need for the design and development of an automated procurement

system, which addressed the total needs of the NFCS activities, became apparent. In June 1977, Naval Supply Systems Command Deputy Commander for Contract Management (NAVSUP 02) undertook the development of a mini-computer based system (APADE II) for the NSC's and the NRCC's using a modular approach under Command Plan # 338. [Ref. 22: Appendix D]

The APADE II system concept was to consist of a standard set of equipment and software components configured according to the performance characteristics required by each of the eleven sites to receive the system. The standard equipment and software set was to be adaptable for each of the user sites according to the definitions and constraints specified. APADE II was to support five functions; procurement tracking, procurement record/history, document generation, management information, and telecommunications interface. The test site for APADE II was NSC Oakland and was envisioned to be contracted out. The following section will provide the responsibilities, mission, configuration, and capability of APADE II.

1. Mission Responsibilities

The mission responsibility of Navy procurement activities that are supported by APADE II are those principally related to the maintenance of an accurate and current administrative filing system. APADE II employed a very powerful but easy to use, real-time data processing system. A new record could be inserted in the file in a very few minutes. Once inserted it can be retrieved from the file, new information added, and reinserted in just seconds. After all processing has been completed on the procurement action, the record is automatically purged so that only pending activity records remain. [Ref. 23: p. 1.4]

2. System Configuration

The primary hardware unit that was installed at each field activity was the Interdata 7/32 Processor, with core memory capacity of 384K bytes (32 fixed and 352 add-on).

The physical location of the processor and peripheral equipment units were to be determined at each activity for most efficient operations.

The APADE II system provided standardization and flexibility for a system that basically supported small purchase. NAVSUP 02 recognized the limitation of the APADE II system and directed the project to undergo a redesign effort in 1980. [Ref. 23: pp. 1.3 - 2.15]

3. System Summary

APADE II provides an automated system that facilitates the administration, control and processing of all requisitions and Purchase Requests within Navy field contracting activities.

a. System Purpose.

The system was designed to enhance procurement performance by:

1. Improving status information and document control.
2. Reducing document preparation time.
3. Improving accuracy of data in system files.
4. Improving buyer efficiency.
5. Improving procurement planning and management.
6. Avoiding unnecessary cost.
7. Improving responsiveness.
8. Reducing Procurement Administration Lead Time (PALT).

b. Capabilities and Operating Improvements.

The APADE II system provided automated capabilities which remove or significantly improved deficiencies of the APADE I system. Principle capabilities included:

(1) On-Line Procurement Tracking/Document Control. Purchase Document Control personnel can within second, determine the status of purchase requests/requisitions in response to customer queries or for use by managers in controlling workloads.

(2) Formal Document Preparation. Data in the APADE II Data Base and data extractes from the Buyer Work Sheets is entered from a CRT and can be used to produce contract documents.

(3) Source Data Automation (SDA) and Source Document Generation (SDG). By employing SDA and SDG technology, APADE II will reduce administrative errors, increase productivity and reduce processing time. Duplicate keying of information is almost totally eliminated and the accuracy of input data is ensured through control of input points and edit procedures.

(4) Procurement Management Information Reporting. APADE II will generate timely management reports to satisfy both internal and external requirements. Frequently used reports can be rapidly retrieved via video display or on a high speed printed. With improved response times, it will be possible to reduce the number and bulk of periodic reports, replacing them with exception reports generated by out of limit conditions.

(5) Real Time Interactive Processing. Procurement data file can be updated as changes occur, providing managers, buyers, customers, and contractors rapid access to current information. [Ref. 23: p. 2.6]

APADE II has contributed to standardization of procurement procedures throughout NAVSUP. The design was flexible to allow for unique requirements of a particular NSC/NRCC, yet personnel trained at one site would be immediately capable of operating at any other NFCS activity. Standardized procedures also enhanced communication between the several agencies and command levels of the NFCS. [Ref. 24: pp. 44-45]

D. APADE - REDESIGN I

After the direction to redesign APADE II, APADE Redesign was a contractor effort. From 1980 through 1983, Booz-Allen & Hamilton (BA&H) was under contract to develop all functional and system level documentation. For the purpose of this thesis and for clarity, this effort is designated APADE Redesign I. During the period of BA&H contract performance, the APADE project was targeted for Perkin-Elmer hardware. Significant problems surfaced during the development process. The software development did not satisfy the objectives and performance requirements specified by the Functional Manager; nor did the modular approach used in the design prove workable in the system's development process. The capability of the computer hardware was, at best, marginally adequate to handle the work. Based on these problems, a decision was made to redesign APADE II. In October 1983, NAVSUP decided to target APADE for TANDEM TXP, Stock Point Logistics Integrated Communication Environment hardware instead of Perkin-Elmer was made by NAVSUP. [Ref. 17: P. 2-4] In order to distinguish between APADE Redesign-Contractor effort (APADE Redesign I), and the current effort which commenced in July 1984, the FMSO project is designated APADE Redesign II for the purpose of this research.

E. APADE - REDESIGN II

Contract negotiations between NAVSUP and BA&H to revise functional and system level documentation for a TANDEM environment failed to arrive at a "fair and reasonable" price. As a result, in June 1984 the responsibility of design, development and implementation for the APADE project was assigned to FMSO, the CDA for NAVSUP. The current Navy strategy requires that an automated procurement system be developed and implemented in phases and targeted for TANDEM hardware at the seven NSC's, four NRCC's, and twenty-two selected sites. [Ref. 25: p. 1-2]

In November 1984, a Procurement Action Task Force (PATF) was established by Naval Supply Systems Command Deputy Commander for Inventory and Information and Systems Integrity NAVSUP 04 to evaluate the current strategy in developing an automated procurement system for the NFCS. The PATF concluded that a potential alternative to developing an automated procurement system was to convert the U. S. Air Force Base Contracting Automation System (BCAS) from WANG VS100 system to a TANDEM TXP using TANDEM native software. Furthermore, if this alternative proved technically feasible and conversion could occur within the next 9-12 months, the PATF recommended that BCAS be implemented as a baseline system on SPLICE hardware at all currently identified APADE sites, as well as the Navy's two ICPs.

As a result of the PATF's recommendation, on 30 November 1984, NAVSUP directed FMSO to conduct a Feasibility Study in support of the APADE Redesign Project. The tasking specifically requested an indepth technical and functional analysis of BCAS. Additionally, NAVSUP requested that FMSO determine the technical feasibility of conversion and impact of the Air Force Base Contacting and Accounting System to the APADE Redesign Project.

FMSO was not requested to determine the feasibility of BCAS to serve as the baseline procurement application for the two ICP's ASO and SPCC.

On 1 December 1984, FMSO initiated the Feasibility Study on the BCAS- APADE conversion by conducting two on-site visits. The first visit was to Gunter Air Force Station, Montgomery, AL, the Design Agency for BCAS. The second visit was to Maxwell Air Force Base. Maxwell's Contracting Office is one of three BCAS prototype sites in operation for the Air Force. During this phase of the analysis, FMSO was accompanied by representatives of NAVSUP 02, NAVSUP 04, Federal Data Corporation and TANDEM Corporation. During the initial analysis of the BCAS system, several technical problems associated with a WANG to TANDEM conversion were identified.

The Redesign II effort is a significant departure from previous efforts although continuing the APADE system objective of improving the responsiveness of the supply system to support fleet and shore activities by providing more effective and efficient procurement service. The Redesign II effort will apply lessons learned from APADE I, II and the Redesign efforts to a Life Cycle Management Approach to develop a totally integrated and exportable system.

Only the APADE I, II and Redesign software which has been proven to be serviceable, which fully met the designed requirements statement and was compatible with the new hardware, was utilized in the Redesign II effort.

The new APADE Redesign II software will contain a significantly expanded file maintenance and data base management capability. The redesigned APADE system will apply the capabilities of data processing, word processing and printing, integrated to the maximum extent permitted by current technology, to facilitate the performance and management of the procurement process. The system does not

provide for the utilization of technical data or automated retrieval systems for technical screens in the document processing phase.

The APADE Redesign II will offer several programs for processing. These include the following:

1. Standard Procurement Data Processing. This program is designed to provide document control, management and buyer support information.
2. Automated Document and Report Preparation. This program is designed to provide documents and reports on a cyclical basis.
3. Interdependent System Support. This program will perform the procurement process. It will provide a standardized baseline for automation of procurement processes throughout the NFCS and also be adaptable to various operating environments.

Planned improvements in the procurement process provided by the APADE system will provide several improvements including an increased responsiveness of the supply system to support fleet and shore activities, cost reductions, and provide automated capabilities to procurement managers, buyers, and support personnel that are not available under manual procurement operations.

F. APADE REDESIGN II OBJECTIVES

The objective of APADE is to automate the NFCS' procurement process. Although targeted initially for implementation at eight NSC's and four NRCC's, APADE Redesign II has identified an additional twenty-two potential activities which would significantly benefit from an automated procurement system. Figure 3.1 provides the initial implementation schedule and milestones for Fiscal Years 1985 through 1988.

ACTIVITY	QUARTERS BY FISCAL YEARS															
	FY 85				FY 86				FY 87				FY 88			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Norfolk	I	I	I	I	I	I	II		III				IV		V	
Puget Sound					I	II			III					V		
Jacksonville							I/II			III				V		
Philadelphia								I/II			III		IV		V	
Newport								I/II			III		IV		V	
Long Beach						I		II	III				IV		V	
Pearl Harbor									I/II/III					V		
Oakland										I/II/III					V	
Washington D. C.										I/II/III			IV		V	
San Diego											I/II/III			IV	V	
Charleston									I/II/III/IV						V	
Pensacola											I/II/III/IV/V					

[Source: 16]

Figure 3.1 APADE Redesign II Implementation Schedule.

The Secretary of Defense has placed great emphasis on improvements in procurement. The need for automation in procurement at the major NFCS activities is one initiative. With the limited or no procurement automation at NFCS activities, the APADE requirements are easily identifiable. NFCS activities have experienced increased workloads as a direct result of recent Congressional action. This legislation has placed great emphasis on competition and ensuring that the product procured meets the ordering specifications. Furthermore, control systems must be incorporated to ensure procurement activities are monitored. These facts all dictate that the automated system must improve the procurement process to include:

1. Increase the productivity of our available personnel resources.
2. Maximize competition among commercial sources.
3. Integrate contracts, receipt control, financial and technical data screening.
4. Provide the oversight tools required by our managers.
5. The automated system must reduce the time for satisfying a customer's requirements and eliminate the dependency on the paper environment.

The major objectives to be provided by the APADE Redesign II are:

1. Tracking/Document Control of Purchase Requests/ Requisitions

The APADE System will provide on-line access to every customer requisition, purchase request, and award document throughout their system life. This will be useful in providing accurate and timely information on the status of procurement actions to procurement office customers and managers. For purchases requiring long lead times, priority actions, or special management attention, a terminal

operator will be able to recall a requisition including planned, actual, and revised milestone dates. Managers will be able to utilize this information in allocating personnel and financial resources against requirements, scheduling leave, assigning personnel, establishing priorities, and measuring performance. [Ref. 26: p. 14]

2. Automated Preparation of Standardized Formal Procurement Documents

A decrease in procurement document preparation time will be achieved through use of the APADE system. When all buyer actions have been accomplished prior to a solicitation or award and necessary data entry has been made, formal procurement documents will be printed as a product of the Buyer Support Processing function. [Ref. 26: p. 14]

3. Source Data Automation

APADE will incorporate principles of both source data automation and source data generation. To the extent possible, APADE will receive external inputs in machine-processable form. Accurate data entry is ensured through control of internal input points and procedures. This will improve the timeliness and accuracy of data in APADE files and records while eliminating redundant and duplicative manual data entry operations. [Ref. 26: p. 15]

4. Procurement Management Information Reporting

Internal and external management reports will be designated by APADE. Frequently-used reports will be designated for rapid retrieval via terminal or in printed format. With improved response times, it will be possible to reduce the number and bulk of periodic reports. These will be replaced by exception reports triggered by out-of-limit conditions designated by each activity. APADE will provide

to buyers and other procurement personnel automated bidders' lists and price history reports which will provide improved information at a greatly reduced effort.

Moreover, improved status information available within the procurement activity will free buyers from performing nonbuying functions relating to customer requests for requisition status. System tools such as a mathematical package and proposal abstracting capabilities will assist the buyer in making more knowledgeable and supportable procurements. Through timely reports tailored to current management needs, managers will be able to more readily assess and attack potential problems. Reports of workloads will facilitate training, scheduling, and assigning of procurement personnel. Planned milestones can provide projections of future workloads by work center. On-line query capability will provide decision support for time sensitive decisions and actions. [Ref. 26: p. 15]

5. Real Time Interactive Processing

APADE will be a standardized data processing system for purchasing designed to provide document control, management and buyer support information, buyer productivity support, automated document preparation, and interdependent system and reporting.

The APADE system will be activated by receipt of a purchase requirement at the customer level. After initial entry of purchase requirement data to the system, via either interface data exchange or terminal, the progress of the purchase requirement will be tracked and monitored through the entire acquisition process to contract completion. Throughout the process various files will be accessed for the purpose of providing status to customers, assisting buyer decisions, accomplishing document preparation, preparing contractual support letters, performing contract

administration functions, preparing external reports, and recording contract completion. In addition, APADE will provide update status/information to related supply, financial and procurement systems where possible. It will be the objective od APADE to automate the entire procurement process to the fullest extent possible. Concepts which minimize the proliferation of paperwork and streamline the procurement system will be initiated.

In order to enhance buyer productivity, they will have immediate access to all the capabilities of the system. In addition, concepts such as electronic signatures, filing, mail and tickler systems will be used. APADE will provide a basic for automation of the entire acquisition processes throughout the NFCS.

APADE will have the ability to accept all data relating to the establishment and updating of a customer request for purchase action as it processes through the procurement process. This includes initial requisition screening and establishment, through the solicitation, evaluation, clarification, award and contract administration stages to final record retirement. Data will be able to be input manually via CRT terminal or in an automated batch mode as in the case of the UADPS-SP and Shipyard Management Information System (SYSMIS) and Material Movement (MM) system interfaces.

All data will be able to be entered to the system via CRT. For some activities, this will be the primary method of data entry. It is envisioned that many customer activities will communicate with the system via a dial-up modem. In such an environment, A command's personal computer, used generally for word processing, work order tracking, etc., will be used to connect the system for either data entry or inquiry.

In addition, manual CRT entry will be required in the procurement activity itself to support non-automated customer activities and walk through requirements. The system will be configured so as to expedite to the fullest extent possible the procurement of walk through requisitions.

The system will be able to accept data through an automated batch mode. To establish a requisition, the system will have the capability to receive and process data in three discrete methods:

1. Acceptance of complete requisition and associated descriptive data. In the case of automated input from the SYSMIS/MM system the total procurement package may be transmitted in machine readable format to the APADE system. APADE will be able to establish a record containing this total package. If separate attachments or drawings are included, a copy will be passes manually or in an automated format from the shipyard to the purchase office and later matched with the Purchase Request.
2. Receipt of ready requisition in MILSTRIP format. In the case of UADPS-SP interface, requisitions ready for purchase action will be passed to APADE. These requisitions are in MILSTRIP format containing an NSN which UADPS has identified for local purchase action. THese documents are automatically edited and screened by the system, purchase requirement record established and assigned for purchase action.
3. Receipt of skeletonized requisitions not ready for immediate action. UADPS-SP will feed available requisition information, usally in MILSTRIP format, to the Purchase Office for items which are under technical review for possible local purchase action. These requisitions will be held in a suspense file

until the hard copy of the requisition is passed to Purchase by Technical who will advise UADPS-SP of the action. The Purchase Office control deck will call up the skeletonized requisition and add the additional information provided by the technical review. As a final step, APADE will ensure that all hardcopy requisitions move properly through the system to the procurement office control desk. Periodically, a skeletonized requisition in APADE which has not been augmented within a resonable time must be identified by APADE, checked against the UADPS Requisition Status File and flagged if an exception condition exists. An exception condition is one in which a skeletonized requisition remains in APADE for thirty days without the Purchase Office processing the hard copy requisition and the UADPS status remains "BV". In order to provide visibility of these reprocessed skeletonized requisitions, the system must record the date entered into the system and the date processed by the control desk. Further, should the Purchase Office request requisition status on an unprocessed skeletonized requisition, the system must provide the current status.

APADE will initiate records and accept changes and modifications to fields in a given record in both an on-line and off-line (batch) mode. A single source will be used for each element in the data base and pertinent data will not be repetitively researched and entered. On-line inputs will be edited automatically at the time of input and appropriate corrections entered via CRT. APADE will be able to handle multiple line item requisition inputs, breakout, and split awards. Additionally if a single requisition results in multiple records, an inquiry by any control number, will alert the inquirer to the existence of the other related instruments. [Ref. 26: p. 15]

G. APADE REDESIGN II PROJECT MANAGEMENT

In order to establish a management control system and organization to develop APADE, a project management approach was created. The organization has been designed with three levels; Approval Authority, Functional Authority and Project Manager/Functional Manager.

Because APADE is under Life Cycle Management procedures, approval authority rests with the Naval Data Automation Command (NAVDAC) who has approved APADE's System Decision Paper II. Deputy Chief of Naval Operations for Logistics, Material Division (OPNAV-41) is the Functional Authority for the project and NAVSUP 02 is the Functional Manager since the user forwards requirements through NFCS activities. NAVSUP 04 has the Project Manager responsibilities and FMSO is the Central Design Agency, responsible for the design, development and implementation of the APADE project. This formalized project management capability was implemented with NAVSUP to ensure that the system is completed within reasonable time and resource constraints. The failures of APADE I and II can be directly attributed to inadequate project control and understanding at the NAVSUP level. [Ref. 25: p. 2-6] Several actions have been implemented or are under development to enhance the project management. These include the establishing of a Project Manager within NAVSUP 04 and a full time Functional Manager within NAVSUP 02 who would be responsible for ensuring that NAVSUP and user requirements are incorporated in the system design, establishing priorities for features to be incorporated in the initial design and subsequent enhancements, and monitoring progress in completing the system. The Project Manager will monitor the project plan through each task, ensuring resources are effectively utilized in each functional area.

Although NAVSUP and FMSO's initial approach was to provide a total automated procurement system in one development effort, a considerable amount of analysis has been performed prior to Fiscal Year 1985 on the strategies for APADE in an attempt to satisfy the buying activities pressing needs. The analysis led to the development of new strategies and milestones for APADE Redesign II. The current project management organization for APADE is provided in Figure 3.2

H. MILESTONES AND STRATEGIES

A paperless purchasing process is feasible and will be pursued as the ultimate goal for the technological and functional enhancement to be made to the baseline automated purchase system. The review of the APADE Redesign II project identified the strategy to develop the entire system system prior to prototype implementation. Due to the magnitude of this effort, an incremental phased approach strongly managed with appropriate oversight and policy reviews will be practiced.

Because of the adverse attention and deep skepticism that the APADE project has attracted in the past, a strong milestone and strategies plan is required. In order to meet implementation schedules within available resource constraints, a milestone plan was developed which breaks the project down into the tasks required for project completion, defines the precedence relationships between tasks using network formulations such as PERT or CPM, and shows estimates of the resources required for completion of each task. Progress in terms of task completion and associated resource expenditures should be monitored regularly by the project managers at NAVSUP. A deliverable product, such as a screen or program which is to be developed during a particular

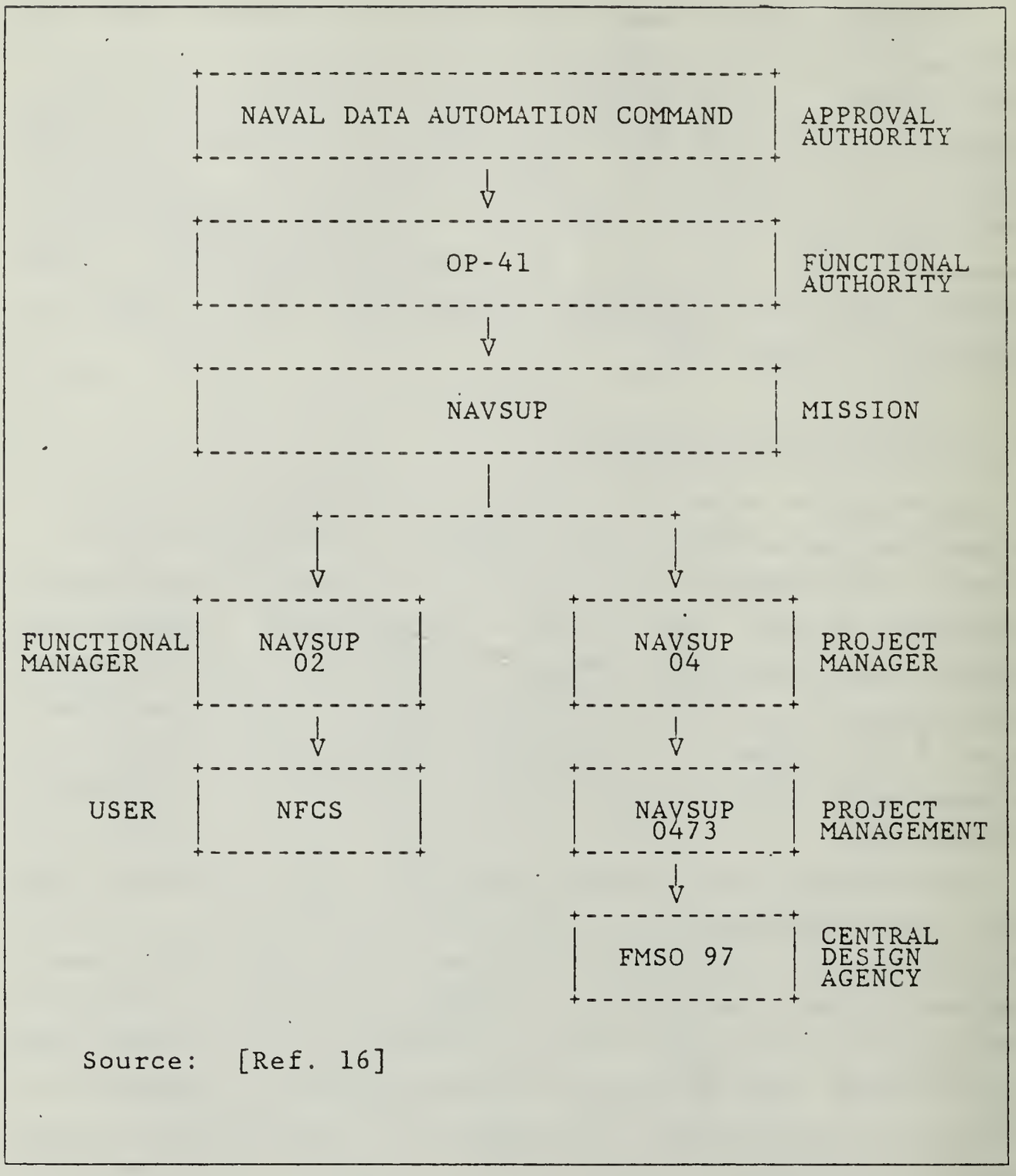


Figure 3.2 APADE Project Management.

task, will be demonstrated before that task is considered to be completed. The APADE program will require several more years prior to implementation to the user level. The

software will still require sufficient testing and evaluation prior to moving into the deployment phase.

Many NFCS activities are employing in-house systems to support local needs. These systems will require a period of transition to complete the implementation of APADE. Table III is the phasing plan for APADE Redesign II to be completed by Fiscal Year 1988.

TABLE III
APADE REDESIGN II PHASING PLAN

PHASE	DESCRIPTION	DATE COMPLETION
I	Small Purchase	December, 1985
II	Small Purchase Enhanced	March, 1986
III	Small Purchase Enhanced/ Large Purchase Tracking	September, 1986
IV	Large Purchase Enhanced	June, 1987
V	Other Enhancements	September, 1987

Source: [Ref. 16]

APADE Redesign II will be developed and implemented in five phases. Because Small Purchase transactions account for 89 percent of the workload within NFCS, Phase I will provide an automated Small Purchase function, thereby maximizing the return on the initial investment. Phase II will further enhance the Small Purchase function as well as allow the contract activity to receive requirements in an automated format. Phase III will provide NFCS activities with an automated Contracting Administration function combined with the ability to track Large Purchase documents on a

Real-Time basis. Phase IV will encompass all requirements to support Large Purchase Contracts. Phase V will further enhance the total system by interfacing with Military Standard Contract Administration Procedures (MILSCAP) established by NAVSUP, as well as refining management ability to fully utilize the system.

> In order to provide a total procurement system, a concurrent development and implementation effort must occur. FMSO will establish a separate team of personnel to train our activities and implement the various phases while FMSO System Development personnel continue down the development time line. FMSO will initiate action to centralize two contracting functions; by this I mean, we will consolidate contract clauses and bidders mailing lists on a central data base. By centralizing these functions, we will reduce the cost of maintenance by performing all changes centrally and subsequently down loading the revisions to our field activities. This will also reduce the burden on our contractors by providing our central location for submission of Standard Form 129 data which indicates their desires to bid on specific materials or services. [Ref. 27]

The current implementation schedule, provided in Figure 3.1, has NSC Norfolk as the prototype site from second quarter 1985 through second quarter 1986. This period include the development and implementation period required by FMSO. NSC Puget Sound, NSC Jacksonville, NRCC Philadelphia and NRCC Detachment, Newport will receive Phases I and II at the same time. NRCC Long Beach, NSC Peral Harbor, NSC Oakland, NRCC Washington D.C. and NSC San Diego will implement Phase I, II and III during the same timeframe. NSC Charleston and NSC Pensacola will implement Phase I through IV and I through V, respectfully at the same time. NSC's Puget Sound, Jacksonville and Pearl Harbor will not implement Phase IV, the Large Purchase Enhancement Phase because of the procurement volume or warranted dollar limitations for each NSC but will combine the implementation of Large Purchase Tracking Phase with Phase V, Other Enhancements.

Paralleling the development of APADE and intending to provide a major portion of its hardware requirement is a project designated SPLICE.The SPLICE project will be discussed in detail in Chapter IV.

I. AIR FORCE BASE ACCOUNTING AND CONTRACTING SYSTEM (BACS)

The BCAS system is a small purchase system designed to be used by 126 Air Force bases. It is currently prototyped at the user activities. It is replacing a standard batch system Customer Integrated Automated Procurement System (CIAPS) which has been operational at base activities since 1971. It is important to note that the BCAS system is automating functions that has been standardized for fourteen years. Their customers have already made the initial adjustment to automation and, more importantly, to standardization. The user documentation available with BCAS is not completed, nor written in "user friendly" fashion. The following sections will compare the systems application with APADE Redesign II as it applies to systems management, supplies and services, Contract Administration, Base/NFCS Contracting Office Management, and Word Processing. Appendix D provides a systems comparison matrix between APADE Redesign II and the BCAS Functional Baselines.

1. System Application with APADE Redesign II

The BCAS system is composed of five applications.

a. System Management

System Management is equivalent to the requisition input, inquiry, and file maintenance function of APADE Redesign II. However, manual entry of requirements is not considered a major function in BCAS because most customer requisitions are input from base supply or medical supply of

which both have automated interfaces to BCAS. The BCAS user activity is fairly standard regarding to interfaces. This is very unlike the Navy scenario where the interfaces vary from site to site. Additionally, in System Management, if an operator is permitted in certain files for inquiry purposes, they are also allowed to change the data, i. e., file maintenance and inquiry functions are in the same transactions. This condition could create significant problems in Data Base Integrity.

b. Supplies and Services.

Supplies and services equates to the Preaward and Award Subsystems of APADE Redesign II. It encompasses transactions that logically occur between requisition entry and contract administration. Due to the number of requirements of APADE Redesign II, including the ability of the buyer to perform most of his/her duties on the terminal, the revised design of APADE Redesign has distributed these functions over three applications: Requisition Input/Update, Preaward Function and Award Function. During these revisions it became apparent to the APADE designers that any other arrangement would eventually result in overcrowded screens. Because BCAS was never envisioned to directly interface with the buyer, a similar rearrangement would have to be effected in order to accomplish this requirement.

c. Contract Administration

The Contract Administration application corresponds to APADE's Contract Administration application. There are many similarities in the function automated by BCAS and APADE Redesign II. The most attractive of these functions is a follow-up system which tracks delivery. As this function is not yet designed in APADE, The BCAS Contract Administration methodology would be functionally acceptable.

d. Base/NFCS Contracting Office Management

This function corresponds to APADE's Report Processing function. Although the system does not support the full range of reporting requirements, the human interface is excellent in this area. The user is provided with an extremely "friendly" means of generating reports. Therefore, the screen design for the applicable reports could be used.

e. Word Processing

The APADE system will offer word processing capabilities. The capability will be required to be available by itself and in conjunction with the system. Letters and other documents will be regularly produced.

The word processing capability will be required to perform as an integrated part of the overall system. That is, preparation of internal reports, external reports, contractual support documents, solicitation, award documents, modifications, and amendments must be accomplished using work processing techniques. Data stored in the automated data base will be required for these documents. Additionally, these documents will include information which will update or augment the data base.

Word processing equipment that offers local network accessing capability plus the ability to interact with data processing equipment is required. In order to produce the volume of documents required, at an acceptable level of quality, and provide hardcopy graphical presentations, create various forms, graphs and multiple high resolution copies of documents, a laser printer capability will be provided with the system. Laser printers, local accessing networks, and document queuing are all available as features of word processing equipment which include

paragraph compilers, search and replace, standard files, margin justification, edit, forms, pagination, search on key word or phase, and tabulation.

2. Summary

The system encompasses the basic functions which are required by a procurement system. However, the system would require substantial revision and procedural changes in order to be totally functional at APADE targeted sites. While some of the system design is "user friendly", it is difficult in some instances to determine how certain functions are performed by the operator. Certain logically related functions are located in different subsystems. Conversely certain BCAS functions such as, the delivery follow-up system, contract administration, and user inquiry capabilities are highly attractive. The design of these functions could be used with very minor modifications. In addition to the aforementioned revisions, all current functional documentation would require rewriting, including development of formal training plans and manuals. [Ref. 25: p. 2-4]

IV. STOCK POINT INTEGRATED COMMUNICATION ENVIRONMENT (SPLICE)

A. HISTORY

The SPLICE project was developed by NAVSUP with the assistance of FMSO in 1980. The intent of this project was to provide an interactive ADP and a greatly improved telecommunications capability at the Navy Stock Points. SPLICE called for the use of standard mini-computer hardware and software as well as a standard interface with the Burroughs system for the new application/systems which would operate under the SPLICE umbrella [Ref. 28: p. 4-14].

The design of the SPLICE system has not only enhanced the phased implementation of new applications/systems,but also provided for a connection with Automated Digital Network II (AUTODIN II) and the telecommunications networking capabilities which are required for projects such as Integrated Disbursing and Accounting (IDA), which will transfer data between IDA regions. The projected growth in teleprocessing requirements at the stock points over the next few years will be significant. SPLICE employs an modular design that will permit hardware and software growth to absorb this workload.

A second objective of SPLICE was to create a telecommunication network independent of the Burroughs system. The stock points utilized a vast amount of Burroughs terminals. This is due to the unique characteristics of the Burroughs hardware architecture and the particular design of the Burroughs telecommunications polling sequences.

A third objective was to develop a network which would permit different vendor's terminals to be utilized to

interface with the stock points systems. The purpose of this would be to facilitate the competitive procurement of computer terminals for the stock points ultimately lowering terminal costs.

A fourth objective was to enhance the Multiple Activity Processing System (MAPS). MAPS enables a small site to receive a full range of Uniform Automated Data Processing System-Stock Point (UADPS-SP) capabilities through a remote terminal connected via a communications link to a host Burroughs stock point system located at a site some distance away. Prior to 1984, the MAPS software operated on the Burroughs 1700 and 1800 mini-computer system. Under SPLICE, the MAPS software was converted to operate on the SPLICE mini-computers. In addition, MAPS has been enhanced to support any local interactive processing that the small satellite sites might required in addition to being able to transmit data to the Burroughs UADPS-SP site for processing.

The SPLICE hardware was implemented in four phases beginning in Fiscal Year 1982 and concluding in Fiscal Year 1985. Phase I would provide for SPLICE mini-computers to be installed at stock points, with channel access to the Burroughs system(s), for running interactive applications like IDA and Navy Automated Transportation Documentation (NAVADS) System, etc. Phase II of SPLICE provided new MAPS satellite capabilities and running of MAPS on SPLICE hardware. Phase III of SPLICE provided full network capabilities and emulation of the Burroughs B 874 front end processor on SPLICE hardware. In Phase IV of SPLICE most of the Burroughs System Data Communications Handler (SDCH) function would be offloaded from the Burroughs hardware and reside in the SPLICE front end processor. [Ref. 28: p. 4-17]

B. SPLICE REDESIGN

In October 1983, NAVSUP decided to change the targeted APADE hardware from Perkin-Elmer to SPLICE (TANDEM TXP). The contract negotiations between NAVSUP and Booz-Allen and Hamilton to revise the functional and system level documentation for a TANDEM environment failed to arrive at an agreement.

In July 1984, the responsibility for design, development and implementation was assigned to FMSO. The strategy required that an automated procurement system be developed and implemented in five phases and targeted for TANDEM hardware at the twelve sites provided in Figure 3.1 The following is the SPLICE Redesign concept, objectives, strategies, requirements, implementation plan, and Project Management structure.

1. SPLICE Redesign Concept

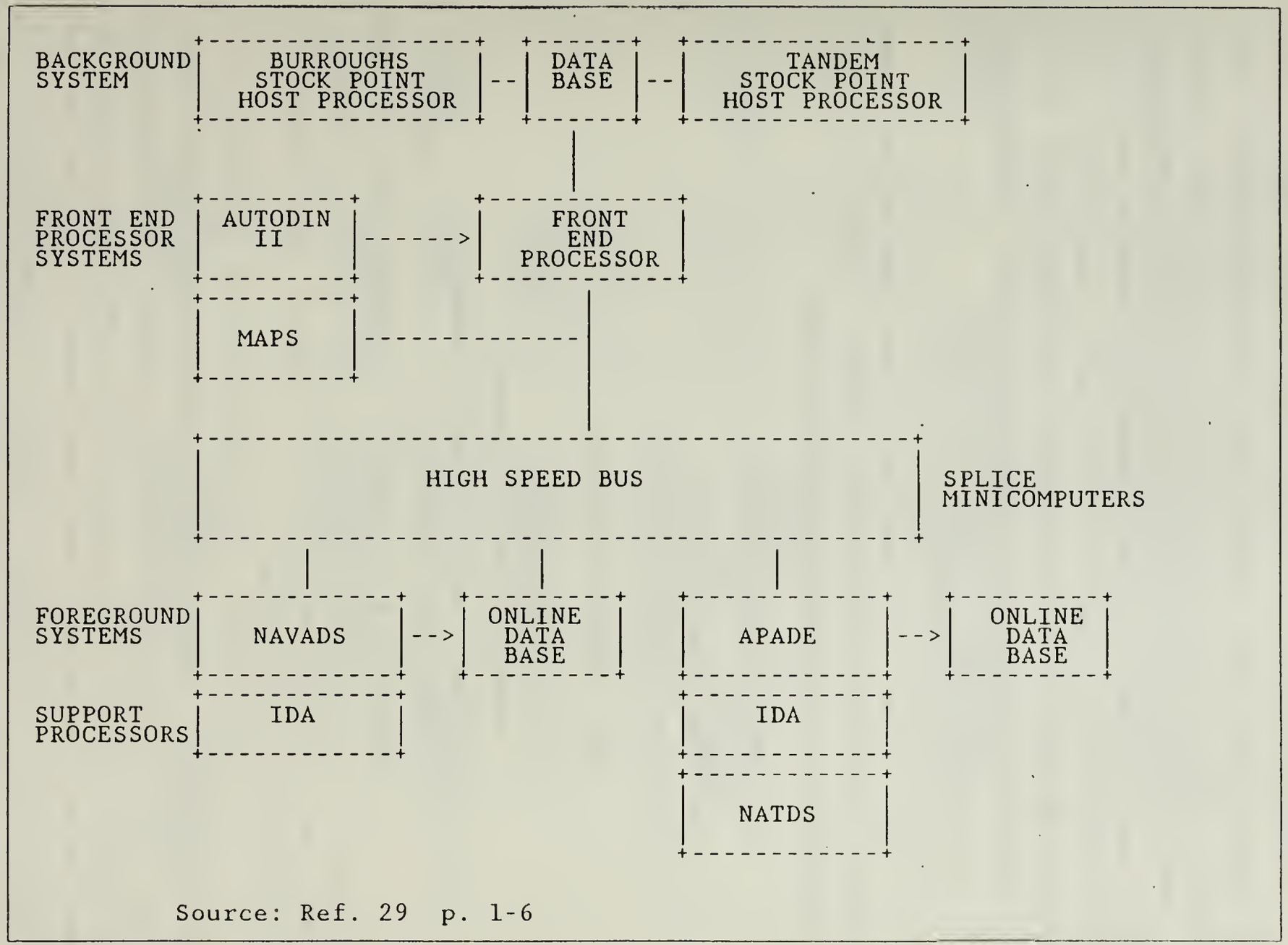
As a subset of UADPS-SP, the SPLICE Redesign concept involves the use of a single computer hardware, and software suite in conjunction with currently installed base of Burroughs systems at Navy Stock Points. Presently the installed host, Burroughs CPU's and front-end processors, is saturated with requirements. SPLICE will consolidate the telecommunications network with a standard suite of hardware and software. The SPLICE computer array is intended to absorb a majority of the communications handling workload, thus extending the system life of the Burroughs equipment. A concept described as "foreground/background" processing has been developed. This concept, as applied to SPLICE, calls for an array of standard computers to be employed as foreground processors at each UADPS-SP site and interfaced via a Local Computer Network (LCN) to the Burroughs medium size systems which would perform the background processing

functions. The foreground computers handle communication lines and terminal management, support interactive operations and stage messages for the background processors. The Burroughs background systems will handle the large file processing applications, report preparation, and major batch applications associated with UADPS-SP processing.

The SPLICE system also enables the Navy to reduce its dependence on Burroughs ADP and enhance the competitive aspects of the Stock Point ADP Replacement Project by providing the Stock Points with a foreground system that is compatible with a wider range of ADP equipments.

SPLICE is a variation of the distributed processing concept being pursued in industry today. Under the true distributed processing concept, separate computers are assigned individual tasks by application, data base, and processing functions. These separate computers could be located thousands of miles apart, or coupled together via communication links. Separating processors can be costly, however, as a result of having to maintain an increased number of computer environments, duplicate personnel for operations and maintenance, and paying for extensive communications lines. To obtain a more favorable cost tradeoff, SPLICE modifies this approach somewhat. SPLICE is a "centralized" distributed processing network utilizing computer arrays physically located in the same computer room, performing separate and distinct functions, yet sharing processing resources for operational backup and for workload leveling. Figure 4.1 provides a graphic display of this distributed processing network.

SPLICE also enhances the currently operable Multiple Activity Processing System. MAPS enables a small site to receive a full range of UADPS-SP capabilities through a remote batch terminal of processor connected via a communications link to a host Burroughs Stock Point System located



Source: Ref. 29 p. 1-6

Figure 4.1 The SPLICE Design Concept.

at a site some distance away. Today, MAPS software runs Burroughs 1700, 1800, and 1900 mini-computers systems. Under SPLICE, the current MAPS functions will be functionally converted to run on the SPLICE computers. In addition, the MAPS capabilities will be enhanced to support any local interactive processing that the small remote site might require in addition to being able to transmit data to the Burroughs UADPS-SP site for processing. [Ref. 30: p. 1-6]

2. SPLICE Configuration

In order to perform these interactive data processing and telecommunications tasks, SPLICE is configured with six integrated component systems:

a. Two software systems

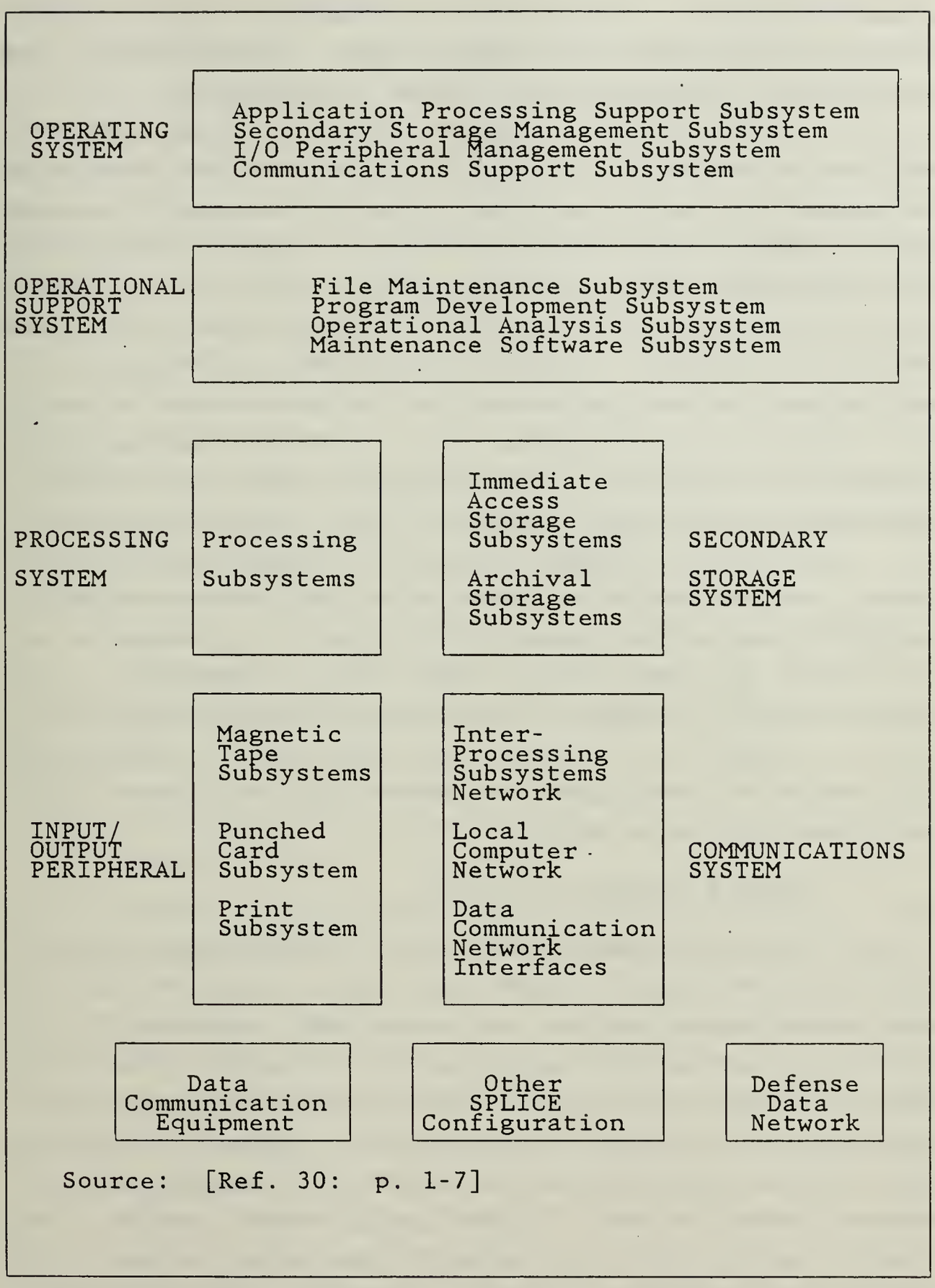
1. Operating Systems
2. Operational Support Systems

b. Four hardware systems

1. Processing Systems
2. Secondary Storage System
3. Input/Output Peripheral System
4. Communications System

Figure 4.2 presents a graphic view of the systems and subsystems of SPLICE. The system will potentially be installed at sixty-two sites in the continental United States and overseas.

The overall architecture of the SPLICE project is composed of a combination of Government-furnished equipment and contractor-provided SPLICE configurations integrated into an environment for system user access to application processes and data bases irrespective of geographical locations or computer systems hardware. A SPLICE network provides the connectivity among



Source: [Ref. 30: p. 1-7]

Figure 4.2 SPLICE Configuration Concept.

geographically distant SPLICE locations. Government-furnished data communication lines connect the locations as a subset of the Defense Data Network.

The SPLICE configuration provides Stock Points with the potential for a centralized distributed processing environment in which multiple SPLICE computers located within a given Stock Point facility and communicating with each other and with systems at other sites will perform separate and distinct functions. Processors can be assigned specific activities. SPLICE computers are capable of handling interactive processing for selected end processing for communications depending on the SPLICE configuration selected for the site, other resident computers, applications, satellite sites, workloads, fail-safe requirements, etc. Non-SPLICE hardware acting as background processors continue to process active applications and are supported by the SPLICE system for communications with local networks and for access to the various DOD remote networks. The resulting mix of SPLICE and non-SPLICE processors and associated equipment will evolve into integrated, standardized nodes within an ADP logistics network connecting Stock Point facilities around the world.

3. SPLICE Redesign Objectives

The SPLICE Redesign project has been developed to provide the Navy Supply System with greatly improved ADP and telecommunications support into the 1990s and specifically to meet the data processing objectives of NAVSUP. The SPLICE objectives reflect those of the command and are three-pronged. First, SPLICE must provide full support to the Navy Supply System, Stock Points and UADPS-SP processing requirements. Second, the SPLICE design must reflect the state-of-the-art ADP technology, complement stock point hardware and software systems, contribute to the NAVSUP

systems plans, provide a foundation for the Stock Point Replacement Project, and provide manageable, maintainable, flexible, and durable, data processing and telecommunications methods for the life of the system. Third, the objectives must reflect sound economics, including acceptable implementation, operation, and manpower costs. The system must be able to survive the requirements of the 1980s to the 1990s and the value of the system to the Command must be measurable. The support objectives are identified as:

1. Enable implementation of new UADPS-SP projects without saturation of the existing Stock Point system hardware.
2. Provide the Stock Points with the interactive capabilities required by new projects or download "functionally transparent" UADPS-SP applications.
3. Develop modular telecommunications subsystems independent of current Stock Point computer systems which will simplify the eventual replacement of the Stock Point computer systems at the end of their useful lives.
4. Provide bulk file transfer capability for support of sites being provided MAPS UADPS-SP access from other SPLICE locations.
5. Develop a SPLICE network utilizing Stock Points, Navy Inventory Control Points and Defense Logistics Agency Stock Points. The Stock Points or ICPs will function as nodes in the network and will exchange information with other Navy Stock Points, Navy ICP, DLA Stock Points or NRCC. These nodes in the SPLICE network are connected via the Defense Data Network (DDN) or via commercial communications facilities.
6. Protect the existing UADPS-SP programs from obsolescence until modernization by the Stock Point Replacement Project. Permit background processing

with Stock Point computers together with SPLICE interactive and telecommunications function.

7. Avoid disruption of Stock Point systems' processing during SPLICE installation and implementation phases. Initially, operate SPLICE systems to assure improvement of Stock point processing and throughput.
8. Locate the SPLICE hardware at sites currently processing Stock Point systems in order to assure system integration, expedite testing and installation, and establish standardization of nodes within the SPLICE network.
9. Provide Navy Stock Points with a secure operating environment via security access system software. [Ref. 30: p. 1-3]

SPLICE Redesign is being implemented in four phases which commenced in Fiscal Year 1985 and will conclude in Fiscal Year 1988.

4. Automated Data Processing (ADP) Strategies

The NAVSUP strategy will permit a modular approach to implementation without disruption in current operations. The UADPS-SP system replacements and augments will enhance Stock Point processing. SPLICE will provide communications on a local basis, telecommunications software, and interface to the Automated Digital Network (AUTODIN) and the planned Defense Data Network will further enhance and expand UADPS-SP capabilities. Stock Point Replacement will provide the Stock Points the processing capabilities needed for the 1990's to replace UADPS-SP and absorb the projected user requirements and estimated workloads. ICP-Resolicitation will replace UICP during the mid 1980's and provide ICP customers with additional data processing capabilities.

The Stock Points' Burroughs systems, UADPS-SP and related applications, has been enhanced to meet interim requirements. The process of upgrading the peripherals began

in 1984 and will proceed through approximately 1988. Some needed additional processor capacity has been met by the procuring of a limited number of used out-of-production Burroughs medium-scale systems. Total replacement of the current Stock Points Burroughs system will take place under Stock Points' ADP Replacement Project (SPAR). Some off-loading of workload from the current Stock Points will be the result of the SPLICE project. The Stock Points' Perkin-Elmer system will be replaced by the TANDEM TXP hardware. In order to distinguish between the contractor effort (SPLICE) and the current initiatives, the FMSO project is designated SPLICE Redesign for the purpose of this research.

SPLICE Redesign will provide fast, responsive service based upon its ability to dynamically distribute workload across multiple processors. ADP systems projected for SPLICE are as follows:

1. Transactional Ledger on Disk.
2. Inquiry programs against Stock Point UADPS-SP files - Multiple Activity Processing Activities.
3. Disk Oriented Supply System (DOSS).
4. Terminal Concentrator (TCON).
5. Navy Automated Transportation Document System (NAVADS).
6. On-line AUTODIN (OLA).
7. Automation of Procurement and Accounting Data Entry.
8. Logistics Applications of Automated Marking and Symbols (LOGMARS).
9. Location Survey/Physical inventory.
10. Conversion of Uniform Productivity Enhancement Project.

SPLICE Redesign contract award was placed with TANDEM in 1984. SPLICE Redesign will coexist with the Stock Point ADP Replacement Project to support the distributed processing and communications environment.

The Replacement Project acquisition and development plan is based upon Life Cycle Management concept principles used in the ICP Resolicitation Project. The Replacement Project will utilize a twenty-four year system life contract to provide state-of-the-art hardware and software to the years 2000 and beyond under a single contracting vehicle. The Replacement Project acquisition documents are currently being developed. Contract award will be in late 1985. [Ref. 17: p. 16]

5. SPLICE Redesign System Requirements

The requirements document was revised with the desire to automate as much of the Navy Field Contracting System as possible with existing hardware. The SPLICE Redesign project incorporates several APADE milestones and requirements through the utilization of planned SPLICE resources. It is envisioned not only that the NSC's and NRCC's would be automated, but also that all activities with more than one tenth of one percent of the total Navy Field Contract System actions or dollar value would be included in the automation project.

Utilizing the concept of the "paperless office", the SLICE Redesign system should provide every buyer a terminal with extensive stand alone capability. This approach will provide the buyer with access to electronic filing, auto dialing, E-mail, and word processing. [Ref. 17: p. 13]

SPLICE Redesign will consist of a source data automation system. This system will have automated ticklers whereby each file would be date-time stamped and action due dates established. A global tickler program or action item management system with access to the file could then automatically provide status on all active purchase actions.

Another requirement of the system will be maximization of automated ordering. The Air Force is currently

employing this requirement with the Automated Purchase Order (APO) and Automated Delivery Orders (ADO) systems, and a large percentage of small purchase actions are automated, thereby freeing purchasing agents for more complex duties. This function has the potential to provide immediate productivity impact of ten to twenty percent if Navy policies were to be aligned similarly to the Air Force in regards to awarding of APO's and ADO's if recent procurement actions for the same item had occured within a predetermined timeframe (30, 45, 60, 90 days). [Ref. 17: p. 14]

The final requirement for the system will require that vendor performance be fed back into the system. Vendor performance is a critical element which is required in any contract decision. In order to gather this data, the interface between the purchasing and receiving programs will be programmed to provide feedback on vendor performance back into the purchasing system. More importantly, the data will be easily facilitated so the buyer will have access to ensure full utilization.

6. SPLICE Redesign Implementation

SPLICE began to be implemented in phases in Fiscal Year 1984 at NSC Oakland, California. The hardware installations are being accompanied by phased functional support. In the first phase of the implementation, SPLICE hardware/software systems are being installed at Stock Points to provide enhanced interactive processing for Stock Point systems. Selected UADPS-SP applications will migrate to the SPLICE hardware for partial or total processing support depending on the application, interactive requirements, processing sites, and other specifications. Processing will take place within the local SPLICE network utilizing SPLICE communications capabilities and, thereby, beginning possible reduction of telecommunications workload on the non-SPLICE

computers while simultaneously providing improved interactive processing support.

In the second phase of SPLICE implementation, remote job entry processing improvements will be developed within the SPLICE framework and made available to the remote Stock Point locations. Software enhancements and SPLICE hardware/software configurations will improve and expand remote processing methods. The third phase of the SPLICE project will establish a fully inter-operable network by implementing the full suite of DDN service protocols within SPLICE systems. The fourth phase, the Local Computer Networking interfaces, will be expanded to support other host systems, as required, and to provide the framework for the Stock Point ADP Replacement System.

At the end of the phases of work, a SPLICE configuration will provide, at a minimum, support of the following Stock Point ADP/telecommunications function:

1. Conversational (interactive) program support.
2. Remote job entry services (including remote input/output queue management).
3. Queued support of transaction input/output terminals.
4. Operating System, Process and File Integrity.
5. Non-disruptive reconfiguration/expansion.
6. Modular expansion of hardware and software.
7. Local screen management support for local display terminals connected to remote processes.
8. User and process routing in support of a distribution transaction processing environment.
9. Location-independent process-to-process communications. [Ref. 30: p. 1-8]

7. SPLICE Redesign Project Management

SPLICE is being managed according to Life Cycle Management (LCM) techniques for data processing systems. A

SPLICE Project Management Plan has been established to identify responsibilities for managing SPLICE using LCM and other methods. Information has been extracted from the plan and is presented in Figure 4.3 and explained below.

The SPLICE Project Management Plan describes responsibilities for the design, development and maintenance of the SPLICE system.

a. Subset of UADPS-SP

Splice is a subset of UADPS-SP and will be managed within a similar organization structure.

b. SPLICE Management

The SPLICE Management structure is as follows:

1. The Functional Sponsor for SPLICE is OPNAV-41.
2. The Functional Manager for SPLICE is Commander, Naval Supply Systems Command (NAVSUP 00).
3. The Project Manager for SPLICE is NAVSUP Deputy Commander for Plans, Policy and Programs Development (NAVSUP 04) who reports to the Functional Manager.
4. The Project Officer for SPLICE is on the NAVSUP 04 staff and reports to the Project Manager.
5. The ADP Manager for SPLICE is the Commanding Officer, Fleet Material Support Office (FMSO) who assigns responsibility to Code 94 who reports to the Project Manager.
6. The ADP Officer for SPLICE is on the FMSO staff and reports to the ADP Manager.
7. The Telecommunications Manager for SPLICE is on the staff of the NAVSUP Telecommunication Branch (NAVSUP 0451) and reports to the Project Manager. [Ref. 30: p. 2-1]

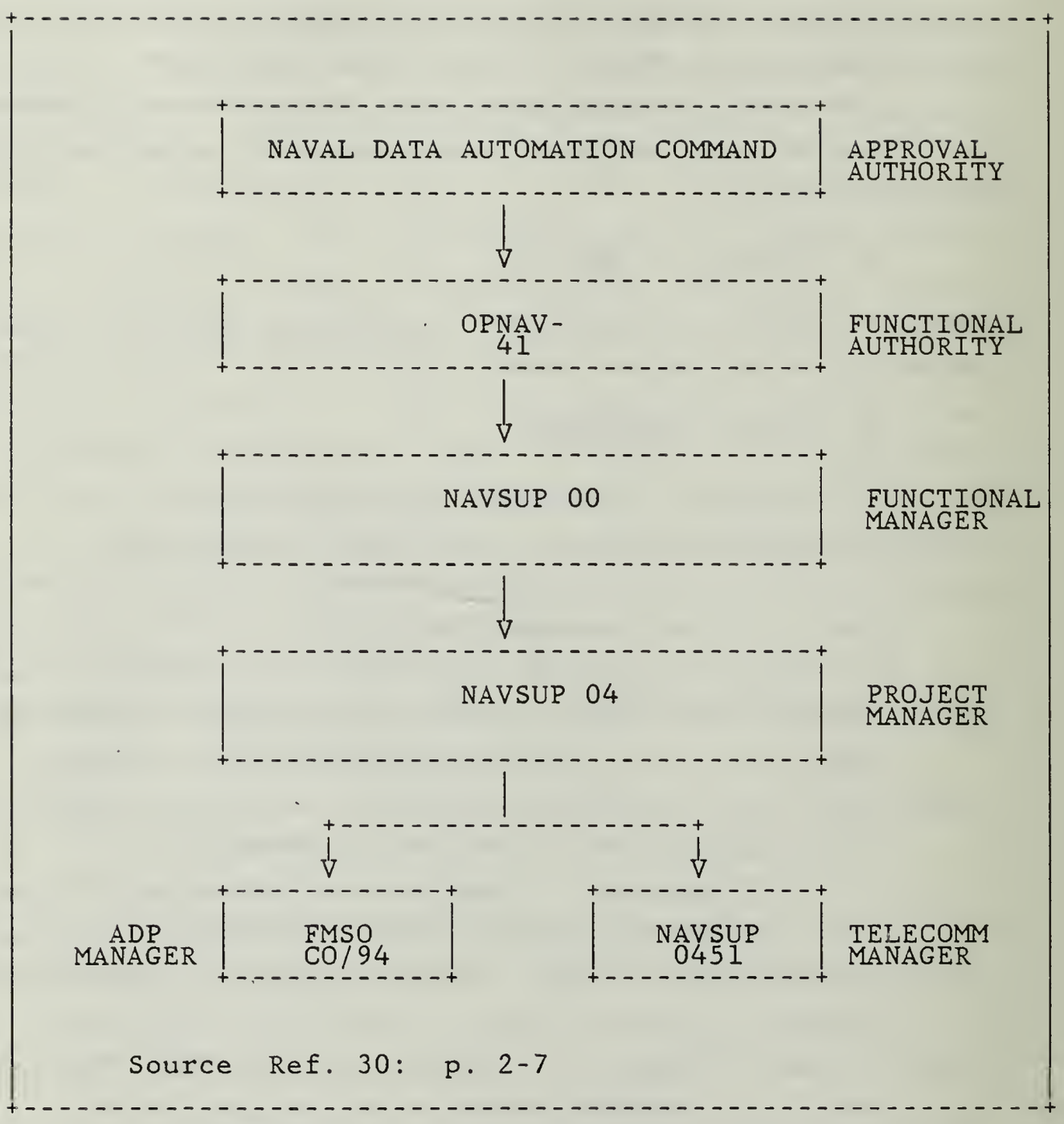


Figure 4.3 SPLICE PROJECT MANAGEMENT.

V. ENGINEERING DATA MANAGEMENT INFORMATION CONTROL SYSTEM

A. BACKGROUND

The need for an automated system to access technical data used by maintenance, overhaul, in-house manufacturing, and procurement activities was recognized several years ago by the Navy. However, only recently have advances in computer technology allowed for the development of an on-line, real-time computer system to access data necessary to carry out those functions.

Activities requiring access may include Naval Air Rework Facilities (NARF's), NSY's, Aviation Intermediate Maintenance Departments (AIMD's), SIMA, ICP's, Naval Supply Centers/Depots (NSC/NSD's), research laboratories, and certain repair ships (AD/AS class). Many hold engineering drawings for use in maintenance, repair, manufacturing or procurement functions; however, data are commonly found to be inadequate to do the job. They may be illegible or missing key elements. Certain pages, or entire sections may be missing. Proprietary data are other examples of the difficulties encountered. The only option for these activities is to contact an official repository for the most current and correct data available.

The Navy has several officially designated repositories whose function is to store, maintain, and provide engineering drawings when required. A directory entitled Military Handbook Directory of DOD Engineering Data Repositories (MIL-HDBK-331C), provides a complete listing of all DOD repositories, their locations, and types of drawings available.

Problems relating to the storage and retrieval of technical data do not usually surface until well after the weapons system has been delivered. Data accuracy and transmission capabilities are serious problems which frequently delay procurement or in-house manufacturing decisions.

During the provisioning process a majority of all items are assigned a Navy Stock Number (NSN). However, all engineering drawings relating to those components are forwarded to Navy repositories where the data is stored and maintained. Also, as engineering changes occur, drawings are revised by the contractor, validated by the Navy's configuration management process, and forwarded to an appropriate repository for inclusion into its official inventory.

A renewed emphasis is being placed on data accuracy, configuration management, and the ability to quickly retrieve data used by various Navy activities. The current system to store and retrieve drawings is slow, labor intensive and subject to many errors.

For example, ASO has a single repository, the Naval Aviation Technical Service Facility (NATSF), which manually stores and retrieves all engineering drawings for the aviation community. NATSF contains over 6,500,000 drawings in its inventory, growing at 240,000 per year [Ref. 37: p. 5]. Other systems commands, such as NAVSEA, have several official and unofficial repositories with many more drawings in its cumulative inventory, making configuration management and storage and retrieval of drawings very difficult to administer.

Based on interviews with procurement personnel at ASO, Philadelphia, SPCC, Mechanicsburg, and NSC Oakland, engineering drawings are required for procurements thirty to fifty percent of the time. The Navy has recognized the need for automating the storage and retrieval of drawings and is prototyping a system called Engineering Data Management

Information Control System (EDMICS) at its NATSF repository, ASO, Philadelphia. EDMICS is being designed to automatically "...store, retrieve, transmit, display, and reproduce engineering drawings" for authorized activities as required [Ref. 32: Attachment B]. Once the NAVAIR prototype is completed at ASO, the EDMICS system will become the official storage and retrieval system for the Navy. All systems commands, NAVSEA, NAVELEX, NAVSUP, and DLA have EDMICS an project office assigned to monitor the NATSF prototype. Once the concept and design of EDMICS is proven at NATSF, all SYSCOMS will implement it under a schedule that is being coordinated by NAVSUP PML-550.

B. DATA STORAGE AND RETRIEVAL

Until EDMICS is implemented, all repositories will continue to process customer requests manually. DOD and the Navy are, however, stressing competition now but the inability to obtain technical data contributes to many of the sole source buys which occur more frequently than necessary.

The Aviation Supply Office (ASO) will be used as an example. Procurement efficiency at ASO is based on Procurement Action Lead Time (PALT), a measure of how long it takes place a buy. Research time to complete a technical data package (TDP) in support of a procurement may or may not be included in PALT; however, access to technical data remains the single greatest factor contributing to delays in the process. [Ref. 33]

ASO policy states that Technical Data Packages (TDP) must be completed within twenty-one days or the item may be procured from a sole source contractor. Because of antiquated procedures at NATSF (and all other repositories), it

is not uncommon for a data request to take over thirty days to process [Ref. 34]. In the past, a procurement of an assembly, subassembly, or part at a fair and reasonable price often gave way to urgency of need. Competition was less important then, but it is now receiving top priority under such programs as BOSS. Automating the storage and retrieval of technical data should shorten the procurement cycle, enhance manufacturing decisions (make or buy), and reduce sole source buys as indicated in Chapter II.

Table IV is a time comparison of manual procedures at ASO and those predicted when EDMICS automated storage and retrieval is implemented. If these predictions become reality, the procurement cycle will be shortened. Urgency of need and pressure from requesting activities will be reduced. Most importantly, competition will be enhanced by providing the procuring activity with better tools to enhance efficiency.

There are, however, other factors which significantly impact procurement delays. Data accuracy and timely updates by contractors have not been stressed by the Navy and only receive proper attention when the lack of data causes a delay. Configuration management and the timely updating of engineerings drawings impact competition and fleet readiness. No matter how well EDMICS functions, data provided by contractors must be available, accurate, and complete when weapons systems are delivered. The role of configuration management and EDMICS will be discussed in Chapter V.

C. NAVY STRATEGY

The Navy strategy for EDMICS started over fourteen years ago and has been implemented in phases as technology allowed more automation and less human intervention.

TABLE IV

MANUAL VERSUS AUTOMATED TIMING COMPARISON

	Current Method	Optimal Press Method	Optimal Auto Method
Customer Requests			
Routine			
ASO	2-3 days	2-3 days	immediately
NARFs, etc.	5-7 days	2-3 days	immediately or 1 day maximum
Priority			
ASO	1 day	1 day	immediately
NARFs, etc.	3 days	2-3 days	immediately
Adding New Aperture Cards			
Rolls	5-6 months	3.5 months	3 months
Utilized	3 months (w/1 inspec)	2 weeks (6 inspec on 2 shifts)	3 days or immediately on val/corr
	2 months (w/2 inspec)		
Set Work			
Routine			
Small 10,000	2-6 months	1-3 months	3 months
10,000-99,999	3-9 months	1.5-4.5 months	6-30 days
100,000 up	4-12 months	2.5-6 months	Not sched for system
Priority			
Small 10,000	1-3 weeks	.5-1.5 weeks	2-6 days
10,000-99,999	3-10 weeks	1.5-5 weeks	6-20 days
100,000 up	10-20 weeks	5-10 weeks	20-60 days
Bulk Film File	50% destroyed new load requires 13 years	50% destroyed new load requires 13 years	5-7 years for new load

Source: [Ref. 37 Attachment C]

EDMICS was patterned after the Army's Digital Storage and Retrieval Engineering Data System (DSREDS) and the Air Force's Engineering Data Computer Assisted Retrieval System (EDCARS). The problem of technical data accuracy, storage and retrieval capabilities is a DOD-wide issue and Congress, in September 1984, tasked the Secretary of Defense to "...develop a plan for an improved system for the management of technical data relating to any major system in the Department of Defense." [Ref. 1: p. 124]

The Secretary of Defense must report to Congress within one year after the date of that legislation concerning its plan to accomplish integrated network that would allow the transfer of information within and between the services. EDMICS, DSREDS, and EDCARS are the vehicles which will enable the services to exchange such data, and therefore, it is mandatory that each system be compatible, both in concept and in hardware/software interface requirements.

D. EDMICS PHASED DEVELOPMENT PLAN

EDMICS has been developed in phases, with three of four completed. Now that hardware/software capabilities have improved in the computer industry, EDMICS Phase IV should be completed by the end of 1989. The following is a brief summary of the phases completed, including a description of the proposed PHASE IV:

1. Phase I: Aperture cards (35mm) have been loaded into the ASO UNIVAC 70/45 system as an inventory file of the latest drawings. Only the latest drawings are on the computer system, with the actual cards being held at NATSF in large tubs for reference.
2. Phase II: The UNIVAC system interrogates the Phase I inventory file for single drawing requests and

status. It simply acknowledges whether a particular drawing is available, but will also generate an automatic drawing request to contractors if the drawing is not held. Phase II then provides status to requesting activities.

3. Phase III: This phase was an attempt to take a contractor's parts list and place it in a format that could be used by ASO. It was supposed to allow for a single request for an assembly or subassembly drawing based on a part number request. Phase III has not been successful because many contractors have identical part numbers which actually represent different parts. The process to manually determine which part numbers apply to a specific part has proven to be too time consuming and Phase III has been discontinued.
4. Phase IV: Under this phase, the UNIVAC system will be replaced by Infodetics and Data General hardware. Infodetics is responsible for software development and some of the peripheral devices such as printers, scanners, and storage devices. Data General is responsible for data base management at NATSF on five mainframe computers (Models MB10000 and MB4000). Phases I and II will be incorporated into Phase IV, which is intended to file, store, retrieve, reproduce, and transmit data to requesting activities via remote terminals. [Ref. 32: Attachment B]

Requesting activities will access EDMICS and receive data in a matter of seconds instead of several weeks. The data base consists of active and inactive files, however, the process of requesting and receiving data will be transparent to the customer. Active files are stored on hard disk for real time interrogation, while inactive files are stored on 35mm aperture cards. EDMICS hardware provides

almost instant data to requesters of an active file, while inactive files take a few seconds longer. Active or inactive data retrieval will essentially be transparent to the requester.

EDMICS is intended to be user-friendly and will allow activities to access its data base in several ways. Within the aviation community most technical branches have a publication called NAVAIR 500A, which provides a list of technical manuals available for each weapons system, including drawing numbers. Data may be retrieved via a document identification number consisting of a drawing number, Federal Supply Code for Manufacturers (FSCM), or type of document and sheet number, all of which is normally available in a technical manual. [Ref. 32: Enclosure (4)] If such data are not available, alternative means such as weapons system number, major assembly number, contract number, contractor identification number, next higher assembly, or part number can also access a top-down set of drawings.

E. IMPLEMENTATION SCHEDULE

EDMICS is currently scheduled to automate eight major repositories. These are: (1) SPCC; (2) Naval Training Equipment Center, Orlando, Fl. (NTEC); (3) NATSF, Philadelphia, Pa.; (4) Naval Ship Weapons System Engineering Station, Port Hueneme, Ca.(NSWSES); (5) Naval Shipyard, Portsmouth, NH. (NSY-Portsmouth); (6) Naval Ordnance Station, Louisville, KY (NOS-Louis); (7) Marine Corps Logistics Base, Albany, GA. (MCLB-Albany); (8) Naval Electronics Systems Engineering Center, Portsmouth, VA. (NESEC-Portsmouth, VA.) [Ref. 35: p. 1]

By 30 September 1985 an architecture plan will be drafted by NAVSUP PML-550.5 for interconnecting the Navy Primary repositories with each other, with other Service/DLA

repositories, and with designated secondary sites. The following schedule provides tentative Initial Operating Capability (IOC) dates Table V provides a date for each of the major repositories:

TABLE V

INITIAL OPERATING CAPABILITY DATES FOR EDMICS

Activity	Date
SPCC	12/87
NTEC	9/88
NSY-Ports NH	3/88
NESEC-Ports VA	12/88
NATSF	7/87
MCLB-Albany	6/87
NSWSES	10/88
NOS-Louis	8/88

Source: [Ref. 35: p. 4]

PML-550 has the following program actions to complete in the near term:

1. The Ad Hoc SYSCOM/MARCORPS/NATSF group on engineering drawings will be formalized.
2. Steps will be taken immediately to have secondary repository requirements defined by SYSCOMs, MARCORPS and NTEC for the EDMICS omnibus contract.
3. A request for information concerning Army/Air Force benchmark scheduling and data exchange standard development will be forwarded as soon as possible.
4. The status of output device technology developments will be solicited from industry.
5. O&MN funding requirements solicited from the SYSCOMs, MARCORPS, and NTEC will be prioritized for the FY86 budget. [Ref. 36: p. 3]

F. PROJECTED COST SAVINGS

The following cost savings are projected for the NATSF repository at ASO (based on 6,500,000 engineering data aperture cards) and should be representative of the cost savings realized by all repositories when manual storage and retrieval procedures are eliminated:

TABLE VI

EDMICS COST SAVINGS

Current Cost of Operation	
Labor (50 billets) + 12% leave & fringe benefits	$ 815,700
Contracts, aperture cards, supplies, etc. ASO-DPSC services, Phases I and II150,000	225,000
TOTAL (per year)	$1,190,700
Cost to provide desired service and target turn around time by manual methods (per year)	$2,065,086
Cost to Provide Equivalent Service and target turn around time by fully automated methods (per year) after amortization (equipment fully amortized in year acquired)	$1,052,560
Predicted Savings(per year)	$1,012,526

Source: [Ref. 37: Enclosure (1)]

VI. APADE AND EDMICS NETWORK MODEL

A. BACKGROUND

One of the major issues facing the U. S. Navy today is a continuing struggle to manage the increasing amount of information necessary for business functions. Information management involves the process that results in correct information being available.

Information management issues are not unique to the Navy since all military and civilian organizations face the same need for accurate and timely information. During the past decade considerable effort has been directed toward solving information problems. Many methodologies and technologies have been proposed and implemented, ranging from faster, more specialized hardware to packaged software. [Ref. 39] APADE Redesign II is currently under development by NAVSUP and the Fleet Material Support Office. The system being designed will incorporate five phases. Table III provides each phase and completion date for the APADE project.

The APADE system will support five basic areas. Table VII provides the Functional areas and specific support requirements. The Buyer Support functional area will support the buyer with a history of purchase prices which will provide the buyer with purchase trends on specific commodities. The buyer will be able to select specific clauses for contracts from a menu driven file. Also, the buyer will have automated Purchase Orders (P.O.), Delivery Orders (D.O.) and Blanket Purchase Agreements (BPA's), on request. In order to assist the decision making process, APADE will provide the buyer with an Analytical Tool program to analyze procurement

TABLE VII

APADE FUNCTIONAL SUPPORT AREAS

BUYER SUPPORT	CONTRACT ADMINISTRATION SUPPORT	DOCUMENT PREPARATION
Price History	Milestones	Paperless Environment
Clauses Menu	Mods Processing	
BPAs	MILSCAP	
Source/Bidders Mailing List	Delivery/Payment	
Analytical Tools	Certification Close Out Information	
Automated P.O./D.O.		
Referals Processing		
Abstract Information		

REPORTS & MANAGEMENT INFORMATION	SYSTEM INTERFACE
Work in progress	Receipt
Production reports	Financial
Inquiries	MILSCAP
Milestone Information	Technical
Competition/Sealed Bid	Customer Service
DD350/1057/UMR	

Source: [Ref. 16]

information. The procurement clerk will have access to Abstract Information and Referral processing files to assist in procurement decisions.

In the Contract Administration Support Functional area, a milestone chart will provide the contract administrator a

means to measure contractor performance. Furthermore, contract modifications will be processed and filed with the appropriate contract. Delivery and Payment certification will be processed through APADE. Finally, the close out of the contract will be accomplished, with appropriate information recorded with the contract file.

APADE is designed to create the paperless environment and will attempt to electronically prepare all documents and pass them via a communications package to contractors. Only when it is necessary and the customer does not have the automation equipment to accept contracts electronically will contracts and documents will be sent to the remote printer.

To support the contract manager, several reports will be issued to measure and monitor work performance, work in progress, production reports, inquiries on specific contracts, milestone information, competition and sealed bids, and DD350, DD1057, and Uniform Management Reports (UMR).

The APADE system will interface with several support activities in the initial processing of the contract requirement. This interface is necessary to monitor the action being taken on a requisition and provide a means to control all documents in the system. Furthermore, the interface will provide the system the capability to communicate with the customer and determine what processing phase the contract is completing. The support areas under the System Interface functional area are Receipt, Financial, MILSCAP, Technical, and Customer Service.

B. REQUIREMENTS PROCESSING

As presented in Chapter III, APADE will provide automated support for procurement management. The procurement process begins with the requisition which is established by

the customer. The requisition is either satisfied by the Navy Supply System or procured through a commercial source. APADE will be employed to manage the procurement from external sources. The required material will normally be issued by the supply system; however, if it is not available or is considered non-standard stock material, procurement action must be initiated. To understand this process and the relationship that requisitions have with the APADE and EDMICS system to procure from vendors the following information is provided.

In order to establish the requisition requirements for the APADE-EDMICS Contracting Model, an understanding of the supply support and requisition processing must be presented. Requisition processing is the initial step taken before the requirement is processed for contract action. Several steps in requisition processing result in conflicts and delays in the procurement process if proper actions are not followed in accordance with supply directives and regulations. Several of the conflicts and delays encountered in the technical processing phase will be presented in support of the need to automate data so that everyone involved, whether the originating activity, customer service, technical, or procurement will be utilizing the same data base. [Ref. 38: p. 4-7]

The supply support process includes a technical screen of all non-standard stock requirements to ensure that the requirement does not have a National Stock Number (NSN) assigned and carried in the Defense Logistics or Navy Supply Systems. The procurement process begins when the non-standard stock requirement is forwarded to the procurement division for action. Under the System Interface functional area, APADE envisions a plan for an interface with the technical branch. This network will provide the means to track the requisition through the technical screening process but

does not provide the buyer with the tools to investigate technical data problems.

Based upon this thesis research, it was determined that most buyers are required to investigate several procurement actions because the technical data provided with the procurement request was incomplete or inaccurate. Often, the contractor is unable to identify the required item or can not interpret the specifications provided by the requesting activity. Insufficient technical data causes delays in procurement action, referrals, and requires the utilization of additional resources to resolve discrepancies.

A referral is an action initiated by a buyer to obtain additional information about a purchase action after receipt. A purchase action on referral will indicate that the action required is beyond the control of the buyer. A record will be maintained for each referral of a given purchase action under the APADE system. The APADE system will provide for situations when a referral is sent out with the expectation that the response to that referral will result in no further action by the contracting department, e.g. alternate supply action will be initiated. APADE will accurately reflect the requisition status. This status will be reflected in action and statistics reports utilized by the contracting officer to measure referral delay time. Under the APADE-EDMICS Contracting Model, a majority of the referrals could be resolved through access to the data base. Other referrals will be reduced by establishing the network of EDMICS data base with the contractor, buyer, and requestor. By establishing a conference call, technical data problems and issues will be resolved.

In several cases, it was determined that the buyer had to conduct his own technical review, after the requirement was processed through the technical branch. Based on

personal knowledge of the item, a buyer knew the requirement had a NSN or that the specification provided was incorrect. This additional step for the buyer is very time-consuming, increases the Procurement Action Lead Time (PALT), and results in a duplication of work effort. If the procurement clerk were able to access an automated data base containing engineering drawings and specifications, many unnecessary procurement delays could be avoided, PALT decreased, and efficiency improved.

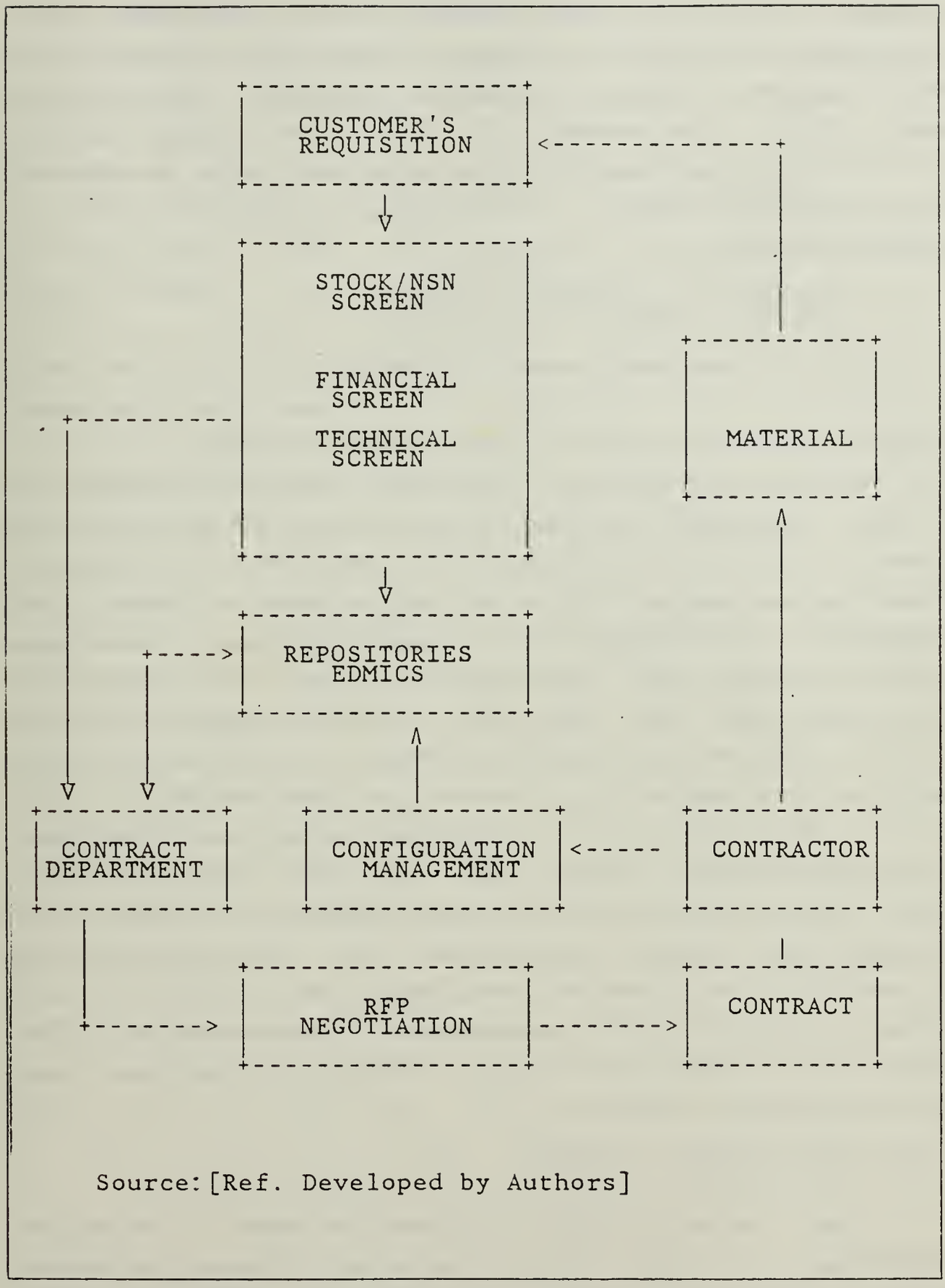
C. APADE AND EDMICS CONTRACTING MODEL

The model incorporates the basic NFCS procurement cycle with the integration of an automated technical data base, EDMICS, automated procurement system, APADE, and Configuration Management responsibilities. Figure 6.1 provides the 'APADE-EDMICS CONTRACTING MODEL'.

The following will provide a description of the model through each step. For the purpose of this research, we will apply the model to the NSC Oakland, California, environment because of its variety of procurement actions, the SPLICE hardware is operational, and the NSC operation best fits the procurement process.

1. Customer's Requirements

The customer creates a requisition based upon a need or requirement. If the required material is not carried at the requesting activity, the requisition is forwarded to the nearest stock point, NSC Oakland, for processing. If the material is available from standard stock it is issued. If the material is not available from the standard stock inventory, the requisition is forwarded to the ICP for issue from another stock point. If the item is non-standard stock or is not available from the Navy Supply System and the



Source: [Ref. Developed by Authors]

Figure 6.1 APADE-EDMICS Contracting Model.

priority of the requisition warrants local procurement, the requirement is forwarded to the Customer Service Branch for processing and to the Contracting Department for procurement. First, the requsition is processed through a series of financial and technical screenings and after completing the procurement process, the material is procured from an external source.

2. Customer Services Processing

When the requirement is received by the Customer Services Branch at NSC Oakland, the requisition is logged into a computer and issues a 'BD' (being delayed) status to the requesting activity. Customer Service conducts a Standard Stock/NSN screen to determine if the item is carried in the Stock Point on board inventory. Once determined that the requested item is not carried on board, the requisition is forwarded to the Comptroller for a financial screen to ensure that the requisition has the appropriate accounting data and the the funding documentation is correct. Upon completion of the financial screen, the document is returned to the customer service branch and the requisition is forwarded to technical branch for screening. Technical personnel ensure that the item is not standard stock/NSN material and validates any specification/technical data provided with the requisition. The requesting activity is required to provide specifications, drawings and technical data on all non-standard requirements. The requirement is then forwarded to the Contracting Department for procurement action.

3. Repositories - EDMICS

In the APADE-EDMICS CONTRACTING MODEL, technical screening personnel would have access to an Automated Technical Data Base. As of 1 May 1985, the prototype system

being developed for EDMICS was located at the ASO repository, Naval Air Technical Support Facility, Philadelphia, PA. Through a computer terminal, current technical data will be available on-line. The EDMICS data base plans to update consistently through the Configuration Manager.

As stated in Chapter V, the EDMICS system will provide technical data, specifications and engineering drawings on demand. As the EDMICS expands to incorporate the repositories listed in Appendix D, several other technical data bases can be networked into the system to support procurement action.

Technical branch personnel will be able to increase production efficiency with an on-line real-time system. The manual search for data and verification of drawings, specifications, and technical data would no longer be required. The customer, technical branch, and the procurement clerk work from the same data base. If problems should arise, the file could be called to the screen, and the contractor, technical branch, and the procurement clerk can resolve the problem immediately. Through automation and the EDMICS link to the APADE system, the processing problems of technical data research would be reduced.

When the contractor has a question concerning technical data or specifications, he will contact the contracting clerk, not technical, to resolve the issues. The contracting clerk often is in need of current commercial specification, Military Specifications (MILSPECS), or drawings in order to complete the procurement process. If EDMICS included a data base with MILSPECS, the buyer would be able to access the on-line system and obtain the current data. The system would also be open for access by selected contractors. The contracters will have limited access to files and documentation which pertains only to the contracts they hold. This would require a security system in the data base.

The APADE system will include a sophisticated series of security levels. These security levels will restrict any particular user's access on a need to know basis. For instance, terminals may be installed outside the NSC contracting department. One customer activity would not be able to access information other than which pertains to its own requisition or contract.

Access to abstracts of responses to solicitations may be restricted to the buyer assigned acquisition responsibility and to managerial personnel at levels higher than the buyer. The system will not provide the degree of security necessary to accommodate classified information.

The system interface function will be the source of output to all interfacing systems and conduit through which machine readable information from external sources will enter the system. Because of the evolving nature of the systems for which a potential interface exists, the interface function would be as independent as possible from the rest of the system. This will facilitate effective changes to interface functions while having minimal impact on the rest of the system.

4. Configuration Management

EDMICS will require a meticulous plan and effort to load the huge data base which currently exists at Navy repositories. The next problem will be to support it through greater emphasis of configuration management as engineering changes occur. The importance of configuration management is stressed because it is the key to a successful EDMICS and APADE interface.

Configuration Management is the cornerstone of the data base and contributes towards ensuring sustained system performance, minimizing the effects of design changes, reducing the incidence of system incompatibility, and avoiding the procurement of obsolete spare parts.

Configuration Management is defined as a

> discipline applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item; control changes to those characteristics, and to record and report changes processing and implementation status. Configuration Management is responsible for the identification, control, and status accounting of configuration items. Configuration items (CI) are the basic units of configuration management. CI is defined as "an aggregate of hardware/computer programs, or any of their discrete portions, which satisfy end-use functions." [Ref. 38: p. 13-3]

This breakdown of CI's is critical to successful application of the configuration management discipline and impacts performance and functional compatibility of the weapon system sub-elements. Specifications must be prepared to document the characteristics of each CI; design reviews and audits must be performed for each CI; engineering change proposals are prepared individually for each CI; and status accounting tracks the implementation of changes to each CI.

A second concept to configuration management is baselines, which refers to the authorized and documented technical description specifying the functional and physical characteristics of a system component. Functional characteristics describe the performance requirements the item is expected to meet. Physical characteristics, on the other hand, relate to the material composition and dimensions of the manufactured item. An item is governed primarily by the intended functional characteristics during development. As the item enters production, it should be defined in terms of its physical characteristics with full consideration for material requirements, part tolerancing, quantities to be produced and delivery schedule. It becomes obvious that the configuration management process must be tailored to a number of configuration item factors, program size, complexity, life cycle state, and that no single set of

management procedures will meet every program need. Since the physical design evolves from the system performance design requirement, it is necessary to control both the functional as well as the physical configuration. This is accomplished through configuration baseline management.

> Three baselines are generally considered in configuration management. These are the functional, allocated, and product baselines. The functional baseline is the initial baseline and is defined by the system specification as prepared by during the concept exportation phase. As the system specification is expanded and refined, contractor specifications are prepared for all new configuration items comprising the total system configuration. These development specifications define the allocated baseline for the system CIs. As the program proceeds through life cycle, system as well as CI design and development continues and results in item product specifications. The product specifications then become the baseline for use during production. It should be noted that the selection of items to be configuration-managed rests with the government and is determined by the need to control an item's characteristics or to control that item's interface with other items. [Ref. 38 p. 13-4].

a. Policies and Objectives

DOD has established policies and guidance governing the configuration management of systems and components. These policies are set forth in military standards describing configuration management program requirements for contractual application and based on problems encountered and lessons learned. MIL-STD-490 covers specifications practices (Configuration Identification). MIL-STD-480 and MIL-STD-481 cover configuration control and established requirements for submittal of engineering change proposals (ECPs), deviations, and waivers. In addition, to these primary standards, there are numerous DOD and service documents highlighting associated area including contractual requirements for those areas not included in the basic standard. [Ref. 38: p. 13-6]

b. Requirements

Specifications prepared in accordance with MIL-STD-490 are intended for use in design and procurement of configuration items, computer programs, and required services for programs peculiar application. Configuration identification is established by baseline configuration identification documents and all effected changes. Configuration identification is defined as "the current or conditionally approved technical document of an item as set forth in specifications, drawings and associated lists, and documents referenced therein" [Ref. 38 p. 13-6]. Configuration identification documents include all those necessary to provide a full technical description of the characteristics of the item that require control at the time that the baseline is established.

Functional Configuration Identification (FCI) (functional baseline and approved changes) will normally include a Type A, system, specification or a Type B, product, specification supplemented by other specification types as necessary to specify:

1. All essential system functional characteristics.
2. Necessary interface characteristics.
3. Specific designation of the functional characteristics of key configuration items.
4. All of the tests required to demonstrate achievement of each specified characteristic.

Allocated Configuration Identification (ACI) (allocated baseline and approved changes) normally consists of a series of Type B specifications defining the functional requirements for each major configuration item. These may be supplemented by other types of specifications, engineering drawings and related data, as necessary, to specify:

1. All of the essential configuration items (CI) functional characteristics, including delineation of interfaces.
2. Physical characteristics necessary to assure compatibility with associated systems, configuration items, and inventory items.
3. All of the tests required to demonstrate achievement of each specified functional characteristic.

c. Configuration Control

Configuration control is the systematic evaluation, coordination, approval, and implementation or disapproval of all changes in the configuration of a system/end product after formal establishment of its configuration identification. Configuration control maintains the functional, allocated, and product CI baselines and regulates all changes thereto. Change control prevents unnecessary or marginal engineering changes while expediting the approval and implementation of those that are necessary or offer significant benefits.

The contracting officer should be aware that engineering change proposal justification may conflict with certain contractual clauses such as those dealing with deficiencies. These deficiency clauses impact contractual financial arrangements and, as a result, may lead to a reluctance on the part of contractors to define ECPs that are corrections of deficiencies. When the changes deal with either safety or interface characteristics, they imply poor system engineering practices. The impact of such contractual provisions may cause the contractor to avoid submission of an ECP. This could result in the loss of the derived effects the changes would bring. Thus, careful tailoring of both the contractual provisions and the standards and specifications should be considered on a program-by-program, phase-by phase basis.

Configuration control requires that certain information be provided in the ECP to completely document all impacts of the change. Early in the development of an end item, the ECP content is relatively simple. It will describe specification wording changes, describe changes in the test program that results from the specification changes, and in some cases, describes the general qualitative impact of the change on the logistics support and the operational capabilities of the system. During the production/deployment phase, a detailed description of changes in part design, of requirements for retrofit/rework of already delivered delivered items and of impacts on the logistics support system (spares, manuals, tools, etc.) must be included in order for the Configuration Manager to assess the total impact of the change. The bottom line of configuration control during production, operation, and contracting is to ensure the continued logistics supportability of the system once the change is approved and implemented. [Ref. 38: p. 13-9]

d. Configuration Status Accounting

Configuration Status Accounting is defined as:

> the recording and reporting of the information that is needed to manage configuration effectively, including a listing of the approved configuration, and the implementation status of approval changes. [Ref. 38: p. 13-9]

Configuration status accounting represents the process of recording the documented changes to an approved baseline and results in the maintaining of a continuous record of the configuration status of the individual CIs comprising the system. Additionally, valuable management information concerning both required and complete actions resulting from approved engineering changes is provided.

Status accounting information includes an index consisting of the approved configuration and a status report detailing the current configuration. All items of the initially approved configuration are identified and tracked as authorized changes to baseline occur.

Status accounting tracking of the proposal document (whether in a formal ECP, preliminary ECP, contractor or program officer letter) from receipt until disposition through disapproval or approval and incorporation in a contract results in expediting the processing of these changes. Status accounting monitors the implementation of approved changes after incorporation in the contract and provides valuable feedback concerning production line, operation unit, and logistic support system impacts. This includes the production incorporation point of the change; the development of new revised manuals, spares, and support equipment; and modification parts kits and associated installation checkout instruction.

5. Contracting Department Processing Requirements

As the requisitions are received by a purchase organization from either automated (UADPS-SP or Shipyard MIS/MM systems) or manual sources they will be entered into the APADE system. These requirements will be edited and validated upon entry. The system will screen for the existence of additional information such as price history or item descriptions which may be used to augment the requisition data. Provisions are made for the automatic ordering of material based on certain criteria without further intervention or action required by a buyer. In most cases requirements will be reviewed for consolidation and assigned purchase request (PR) number by the system for processing by buying personnel. The system will assign acquisition responsibility for the PR according to local

criteria and create a CRT screen format worksheet. This worksheet will represent the total information available concerning the requisition which has been received and will serve as the consolidated source of information for the buyer. [Ref. 17: p. 12]

Upon receipt of the requisition and worksheet, the buyer will initiate the appropriate action to process the procurement. It is envisioned that small purchase acquisitions will be made utilizing direct CRT input with assistance in clerical activities such as automated dialing, electronic filing, etc. During the course of this action, subsequent events may be recorded in the APADE system. These subsequent events include referrals, cancellations, buyer reassignments, milestone planning, and preparation of various letters and other contractual support documents.

The buyer will also draft solicitations which may require clauses, interaction with the Rotating Bid List, amendments, and associated notifications. The system will prepare the required documents. When responses are received to solicitations, the offers will be abstracted in the system and updates to the Bidders Mailing List will be made.

Before requesting a source list the buyer must select the commodity group and decide if the solicitation is to be restricted to small business or unrestricted. If the solicitation is to be unrestricted, the buyer is advised of the total number of vendors in the chosen commodity group. The buyer will then select the number of vendors to be on the source list. If the buyer selects the total commodity group then all will be selected. The date of the last solicitation on file for all contractors in the group will be updated to the current date, and all new business will be moved to their respective business category for future solicitation. If the buyer chooses to solicit only a partial list, the last vendor to receive an award for an

item in a commodity group will automatically be selected for the source list. [Ref. 17: p. 4-7]

All the new businesses in the commodity group will be added to the list. Then the number of vendors requested by the buyer will be added to the list. A pro-rata selection within each business category will be by older date of the last random procedure. The new business and vendors in inactive status will not be included in the pro-rata calculation. The buyer will have the option of adding any source in the vendor file to the list. The date of the last solicitation for all vendors selected for the source list will be updated to the current date, and new businesses will be moved to their respective business category. At the end of this list those firms in the commodity group currently coded as suspended or debared will be listed. Source selection for small business restricted solicitations will be essentially the same but only small business categories will be used.

The APADE system will prepare solicitations where appropriate and update applicable records. Solicitations refer to both oral solicitations and prepared documents including Invitation for Bids (IFB)/Sealed Bids, Request for Proposals (RFP), and Request for Quotations (RFQ). An RFQ will be produced on a SF18 while an IFB or RFP will be produced on a Standard Form 33 and will also include a DD1707 cover sheet. Solicitation numbers will be assigned by each purchase organization using the automated system provided within APADE.

When a formal solicitation document is to be prepared, the APADE system will present an image approximating the appropriate form having data previously input displayed in the appropriate field. With EDMICS, the buyer will be able to provide the drawings, specifications and technical data electronically or by hard copy to the

contractor. Additionally, the data base would provide clauses, terms, and provisions to support the contract. Appropriate mandatory clauses will be invoked by anticipated contract type, item type and other criterion although some clauses may be deleted if necessitated by the situation. Conversely, additional clauses may be added to the mandatory clauses to complete the solicitation terms, certification and representations, special provisions, and general provisions as required by NSC Oakland. Formal documents may be printed on demand or stored for later printing in a batch mode.

A formal solicitation record will be created to save the clause used in the solicitation, the exceptions cited to those clauses and the textual material supplied as the statement of work, technical instructions, technical data, and package and invoicing instructions. [Ref. 17: p. 19]

The APADE system will employ a math package and other commercially available software to assist the buyer with evaluation of offers received and will be able to generate required support documents requested by the buyer. Following the evaluation phase, buyer information will be input and will trigger the generation of an award document from the APADE system. In the case of awards not requiring formal documents, The appropriate system updates will be performed. If negotiated procurement is completed, the buyer will enter the agreed upon information into the data base and the system will update the necessary files. After award, an activity may choose to create contract administration milestones for those procurements having high visibility. [Ref. 17: p. 7]

Throughout the procurement process, interface with various supply, financial, and technical systems will occur. This interface process will either obtain information from these systems or provide updates to the systems from APADE and EDMICS.

6. Post-Award Contractor's Responsibilities

The Contractor will receive the contract from the NSC Contracting Department. The ordered material will be off-the-shelf, require manufacturing, or require some action by the contractor to complete the material for shipment. The contractor will be responsible for documentation, packaging, handling, and delivery of the required material to the Government/Customer. Once the customer receives the required material, the customer's receipt document is forwarded to the contract administration branch for processing. At this point the payment process and the close out of the contract is completed

The contractor will also have a second mission in this model. A large portion of the technical data stored in the EDMICS system will be provided by a contractor, therefore, the task of providing updated technical information to the data base will come from the contractor. If the contractor is tasked with keeping his portion of the data base current by providing changes and documentation for the items he manufactures and submitting documentation through the Configuration Manager, the system would be an on-line real-time system under the EDMICS design. [Ref. 17: p. 16]

D. MODEL INTERFACE

Even though customer service, technical, and procurement divisions are physically and functionally separated, there is constant communication required to complete the procurement cycle. For example, NSC, Oakland is responsible buying items for many diverse activities. A typical sequence of events is provided to demonstrate the need to quickly acquire current, accurate, and complete engineerings:

1. Mare Island Naval Shipyard has a requirement for an item and provides drawings to support the procurement

request. If the drawings are not available locally, a Navy repository is contacted, a drawing package is duplicated and mailed to Mare Island. This process alone can take over thirty days to complete.

2. NSC, Oakland receives the request, along with supporting drawings, usually by mail. The requisition is processed through Customer Service Branch. If the the requisition is non-standard and designated for procurement, it is forwarded tofinancial screening to audit accounting data and then to the technical branch, where the requisition is screened for NSN's, substitutes, next-higher-assemblies, etc. When a manual review of technical publications, microfiche, etc. is exhausted, technical branch forwards the requisition to the contracting department for the procurement action.
3. Based on the data provided by the requesting activity and the NSC's technical branch, a procurement clerk attempts to translate the information into contract language for the purpose of placing a buy. It is common for both divisions to exchange information throughout this phase. For the purpose of this model, the process of soliciting and selecting a contractor is assumed to be complete, though it is a time consuming process. Now, assume that a contractor has been selected, but has questions concerning the drawings provided. The procedure at NSC, Oakland is to have the contractor write a letter describing the problem, along with drawings to support the questions. Note that the procurement division is the point of contact for the Government, even though a buyer is usually not qualified to answer technical questions. The buyer must then consult with either the NSC technical division or

write to Mare Island and resolve the problem. Once again, this process is slow and could take several weeks to resolve.

4. Assume that the contractor's questions have been answered and the procurment process is completed.

Under the APADE/EDMICS concept, a centralized data base of engineering drawings and contractor specifications have been provided to the requesting activity, NSC Oakland customer service, its technical branch, and contracting department via remote terminals. Data have been provided via a SPLICE network which has linked field activities with appropriate data repositories. Thus, a paperless environment exists and everyone has access to the same data. Instead of taking several weeks to define a requirement for competition, or to resolve a technical question, the requirment could be advertised within a few days in most cases.

The model employs the concept of a centralized data base containing drawings, contractor specifications, and technical data. This data base would be accessed by the technical branch, the contracting department, contractors, and the customer. By establishing a centralized technical data base for all the players in the procurement process, many unnecessary delays and problems can be resolved more efficiently.

The data base is updated by the contractor. This tasking will require new clauses in future contracts so responsibility for maintaining the data base is placed with the contractor. This new requirement will require DOD to compensate contractors for their efforts, but will provide the configuration manager with data that are consistent with engineering changes.

E. SUMMARY

During production, a contractor may have several questions about drawings and specifications. With all personnel working from the same data base, the procurement division could orchestrate a response very quickly by having appropriate technical personnel call-up the drawing in question, possible resolving the issue immediately. The buyer is then in a better position to decide whether the requirement has been changed as a result of new information. If a change has indeed occured, contract modifications and price adjustments must be made to the contract.

Automation will affect resource allocation and the way business is done today. There may not be a distinct separation of responsibility between maintenance, technical, and procurement as it currently exists. Automating a common data base can only improve maintenance and procurement cycles, but conventional methods of separating responsibility may become obsolete.

Currently the Tandem TXP does not possess the capability to display graphics. The EDMICS system will utilize Data General Hardware with a 1240 X 1240 graphics capability. In order to link these two systems together, the addition of graphics to the TANDEM system is required. Otherwise, alternatives to networking this capability to APADE will require other consideration. Through a communications software package the Data General hardware could transmit the EDMICS data to the Tandem TXP and transmit the information to a personal computer (PC)/Tandem Microcomputer with graphics capability. However, the density and clarity of the 1240 X 1240 graphics capability for the Data General terminal has not been achieved by the PC environment.

A second method to complete the link would be to develop the graphics capability under the SPLICE program. The

Tandem representative stated that graphics has yet to be incorporated into SPLICE but the technology is available. [Ref. 40]

A third method of implementation of this model would be to provide a Data General Graphics terminal in the technical branch and a second terminal in the contracting department. Through the use of a communications package, the EDMICS data could be sent to the terminal and if necessary stored into the APADE file for the specific requisition. This would require the networking of the EDMICS and SPLICE hardware to support APADE system.

With the graphics capability added to the SPLICE hardware, APADE would be able to access EDMICS and provide additional capabilities and management tools for the buyer. The buyer would be able to graphically display bids and determine if they fall within a competitive range. Procurement history, contractor performance and commodity trends would be displayed graphically if the capability was available. This management tool would enhance the performance of the buyer.

VII. SUMMARY AND RECOMMENDATIONS

A. SUMMARY

This thesis has attempted to answer the following question. Will the procurement of spare parts be improved if technical data were made available through automated means? In order to make any recommendations, the following questions were considered:

1. What efforts are being developed by DOD to automate technical data and can they be tailored to meet the objectives of Project BOSS?
2. What types of data are needed for the procurement process?
3. Will the integration of APADE and EDMICS meet that need?

In order to answer those questions, thesis research relied on a survey of twenty-five field procurement activities, with on-site visits and interviews with contracting officers, buyers, technical personnel, customer service, and the user community. A survey was taken at NSC's, Naval Air Stations (NAS's), NRCC's, and several laboratories. Specific questions asked are provided in Appendix B. On-site visits were made to ASO, Philadelphia, PA., SPCC, Mechanicsburg, Pa., NRCC Long Beach, Ca. and NSC Oakland, Ca.

Similar problems surfaced in both the survey and the interviews. These were:

1. Excessive research time is required by technical divisions to identify items having a National Stock Number (NSN) or to gather sufficient technical data for a competitive procurement.

2. There is never a clean break between technical and procurement divisions. A continuous exchange of information is required throughout the procurement cycle, from item definition, solicitation and selection, through contract administration.
3. Most activities stated end-strength was sufficient, however the need for a system such as APADE is highly desired. Efficiency and shorter procurement timeframes were thought to be its benefit.
4. The standard methods for obtaining technical data are through technical journals, market survey, Standard and Poors, Thomas Register, GSA catalog, Federal Supply Schedule, previous contracts, or local DCASMA's. Suppliers/Parts II is the only automated system found during this research effort that deals with technical data.
5. Several activities expressed a desire to have engineering personnel in their technical branches. Procurement divisions are the point-of-contact after contract award; however, no engineering expertise is available to answer technical questions when asked by contractors.
6. During the solicitation process field activities requested that at a minimum, the following data is necessary: MILSPECS, MILSTDS, NSN, FSC, part numbers, commercial part numbers, and engineering drawings with correct specifications.
7. The most frequent problems in the procurement process are that statements of work are insufficient or specifications are incorrect or incomplete when provided by customers. Procurement delays most commonly occur because requirements cannot be defined sufficiently the first time. Additionally, contract modifications frequently occur because incorrect specifications are discovered after the contract has been awarded.

8. ICP's found engineering drawings especially useful during the breakout process. Research and verification of technical data is the greatest single problem in identifying breakout candidates.

B. CONCLUSIONS

Weapon systems have normally received the benefit of technology and automation, while many supporting functions, such as procurement, have not changed and continue to operate much as they did twenty-five years ago.

The workload and complexity of each procurement has increased. Each solicitation must consider socio-economic conditions, competition, small business set-asides, labor surplus areas, data rights and many other requirements introduced through legislation and now part of the DOD Defense Acquisition Regulation (DAR). Procuring activities, however, do not always have sufficient data to base a procurement decision nor the tools to obtain it easily.

The need for an automated procurement system for DOD has been discussed for several years. While attending George Washington University in 1974, Lt Dean Guyer addressed the subject in a thesis entitled, "Developing an Integrated Management Information System for Defense Procurement Management." The report mentioned a study conducted by a Joint Army, Navy, Marine Corps, and Defense Supply Agency (today known as the Defense Logistics Agency) that produced a list of concerns expressed by functional managars about management information systems available at that time, concerns that have not been solved even today. The report stated that functional managers were "...looking for timely, relevant and accurate data which would be readily accessible with a minimum of functional effort." [Ref. 41: p. 4] The

report went on to state that functional managers also had other difficulties such as:

1. Requirements could not be communicated to procurement personnel;
2. Once requirements are developed, they were continuously subject to change;
3. Functional managers do not live up to their responsibilities to maintain data bases;
4. Real-time, interactive, automated systems are becoming available and are necessary for better procurement management. [Ref. 41: p. 4]

APADE has been under development for over fourteen years, but has not yet been implemented. Unlike when Lt Guyer's thesis was written, hardware and software is now capable of providing a real-time procurement system, one that can fully describe a requirement and integrate changes on a real-time basis. The real problem today is not hardware or software, but how to purge unnecessary or repetitive information , such as engineering drawings, and how to document changes quickly so that data base integrity is maintained and truly reflects weapon systems in the field.

The need for an automated procurement system is real, as evidenced by a proliferation of micro-computers at the field level. Many procuring activities could not wait for APADE and independently designed systems on micro-processors. For example, NRCC Long Beach procured Wang hardware and wrote locally unique computer programs to meet their needs. SPCC, ASO, NSC San Diego, NSC Charleston, and NSC Oakland and several laboratories have each attacked the problem independently when APADE did not come to fruition.

Technical data accuracy and accessability is another support function that has not received the benefit of automation and directly impacts the procurement process. DOD procurement, maintenance, and overhaul personnel do not have

ready access to timely data when compared to counterparts in industry. They do not have the tools necessary to do an efficient job and totally rely on manual procedures. Technical manuals, contractor publications and specifications are the norm, with microfiche being the nearest form of automation available.

The capabilities designed into EDMICS, as discussed in Chapter V, are long overdue. Once again, however, it has been under development for several years and the user community has become impatient, with independent action taken to solve the problem. For example, NAVSEA is currently investigating a project called "Suppliers/Parts II", a data base of Federal Catalog information (NSN, part number, and military and commercial specification, or standard technical characteristics) made available to DOD through the Library of Congress FEDLINK program on a subscription fee basis. [Ref. 42: p. 7-8]

The system was developed by Innovative Technology Incorporated of McLean, Virginia, who set up a Technical Logistics Reference Network (TLR Network) from a data base obtained from the Federal Supply Catalog. [Ref. 42: p. 7-8] The Suppliers/Parts II data base has been loaded on a Univac 1100/10 mainframe, with remote entry available to subscribers. Access may be gained if the requesting activity has an item NSN, a combination of manufacturer's Federal Supply Code for Manufacturers and part number, or by characteristics, such as Military Specifications (MILSPECS) or Military Standards (MILSTDS) to NSN. It has an additional benefit over EDMICS in that MILSPECS and MILSTDS are incorporated into its design.

Large projects such as APADE and EDMICS often overlook or cannot accommodate features critical to the operating environment. For example, APADE has not considered technical data retrieval in its design, while EDMICS is not

designed to accomodate MILSPECS and MILSTDS. The thrust of this research has stressed the need for procurment personnel to have technical data available and that it is just as important to them as it is to technical or maintenance personnel. However, it is also realized that computer design cannot always foresee or accomodate every requirement a customer may desire.

It is concluded, however, that technical data , such as engineering drawings, are critical to the procurement process and will enhance the goals of Project BOSS. Appendix F provides an extensive list of requirements that would be enhanced through such a network.

It is not, however, necessary for a complete APADE redesign to provide that capability. NAVSUP should instead take advantage of both project designs (APADE and EDMICS) and interface hardware and software. Based on that conclusion, the following recommendations are submitted.

C. RECOMMENDATIONS

Infodetics Incorporated (EDMICS software/peripheral hardware) and Tandem Incorporated (APADE hardware) were contacted as part of this research effort. The following alternatives exist in the proposed interface between the APADE and EDMICS systems:

1. Infodetics should design the interface between Data General and Tandem just as they have interfaced Data General to IBM at ASO. Infodetics' proprietary software design makes this approach necessary. Infodetics point of contact is Mr. Dan Cota.[1]

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[1]Infodetics Corporation, Mr. Dan Cota - Commercial (714) 695-9500

2. Tandem does not have graphics capability today and will not likely be developed by the time APADE is implemented. A second option, therefore, is to utilize Data General terminals to process both EDMICS APADE requirements.
3. MILSPECS and MILSTDS are commonly required for reprocurements, however, EDMICS only contains contractor specifications. Therefore, it is recommended that NAVSUP PML-550 analyze the Suppliers/Parts II system as a potential source of automated MILSPECS and MILSTDS.[2]
4. It is costly and unnecessary for field activities to have two sets of hardware (Tandem and Data General) installed when one can accomodate technical and procurement requirements. However, at a minimum, every technical division should have Data General terminals installed to access the EDMICS data base.
5. Surveys and interviews with Navy repositories indicate that engineering drawings do not always reflect the latest weapon systems configurations for various reasons. Assuming that APADE and EDMICS are interfaced, data must be accurate and timely. Therefore, configuration management can not be emphasized enough. Automating the storage and retrieval of incorrect data will only create more problems than presently exist. It is recommended that those responsible for configuration management review EDMICS' design before it is implemented.

In summary, the availability of technical data is no longer a luxury and is considered mandatory if spare parts are to be procured at fair and reasonable prices. Every buyer interviewed during this research effort indicated that

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[2]NAVSEA, Gary Sharp - Commercial (301) 283-7197 or Autovon 364-7197.

engineering drawings would assist them in the reprocurement process.

Distinct functional responsibilities now separate the requesting activity from technical and procurement branches. Today, however, the procurement process is a logistics effort, requiring cooperation and flexibility. Automation efforts such as APADE and EDMICS will provide enhancements, but will also require a willingness to modify or completely change existing procedures if it is to be successful.

D. AREA OF ADDITIONAL STUDY

An area of additional study relates to the hardware/software interface between EDMICS, APADE, and possibly Suppliers/Parts II. In discussions with Tandem and Data General, it is necessary for Infodetics to provide the interface because of proprietary input-output design. How the interface is actually designed warrants additional study.

APPENDIX A

INDIVIDUALS CONTRIBUTING TO THE RESEARCH EFFORT

Abramsom, A., Project Manager for EDMICS, Naval Technical Information Center, Philadelphia, Pennsylvania, 7 February 1985 and 2 April 1985.

Allen, E., Head, Technical Support Branch, Naval Shipyard, Long Beach, California, 1 February 1985.

Campbell, T., CDR, USNR, Naval Regional Contracting Center, Long Beach, California, 1 February 1985.

Cangalosi, D.S., CAPT., SC, USN, (NAVSUP 034), Naval Supply Systems Command, 1, 3 and 4 April 1985.

Cohen, J.M., CDR, SC, USN, (NAVSUP 025), Naval Supply Systems Command, 1 and 5 April 1985.

Cole, B. , CAPT, SC, USN, Commanding Officer, Naval Supply Center, San Diego, California, 29 September 1984.

Coyle, T. A., LCDR, SC, USN, (FMSO 974), Fleet Material Support Office, 2, 3, and 5 April 1985.

Gandola, K.D., CDR, SC, USN, (NAVSUP 0473), Naval Supply Systems Command, 1, 3, and 5 April 1985.

Genovese, J.J., (PML 550), Naval Supply Systems Command, 15 February 1985 and 3 April 1985

Gorman, W., (NAVSUP 033), Naval Supply Systems Command, 4 April 1985.

Jarman, C.E., Jr., Capt., SC, USN, (NAVSUP 02), Naval Supply Systems Command, 1 and 5 April 1985.

Mastrandrea, G.A., Capt., SC, USN, (SPCC 200), Ships Parts Control Center, 2 April 1985.

Matsushima, R. F., LCDR., Executive Officer, Naval Regional Contracting Center, Long Beach, California, 1 February 1985.

McPeat, D. J., Assistant Director, Naval Technical Information Center, Philadelphia, Pennsylvania, 2 April 1985.

Musgrave, A. W. Jr., CAPT., (PML 550B), Naval Supply Systems Command, 15 February 1985 and 5 April 1985

Smith, D., CDR, SC, USN, (FMSO 97), Fleet Material Support Office, 2 and 5 April 1985.

APPENDIX B

QUESTIONNAIRE

1. What is your monthly procurement action level in terms of dollars and number of actions?

2. What is your procurement authority?

3. How many people are in your department?

4. Provide a line diagram of your organization by position and grade.

5. Are you short in end strength? Assuming technical research personnel are part of that end strength, could your activity do its job with existing personnel if data research were automated?

6. Describe the process your activity follows when researching technical data in support of a Request For Proposal (RFP).

7. What factors contribute most significantly to delays in preparing a correct solicitation?

8. Define "technical data" as it relates to your job.

9. If you could have the ability to retrieve technical data via an automated method, what type of data would you require?(i.e. MILSPEC, NSN, P/N, picture of the item or technical drawings, etc). Provide a list.

10. If it were impossible to automate technical data under real-time conditions, what other means would assist you as a buyer? (i.e. michrofiche, telephone access to a repository, etc.)

11. If you were to utilize the procurement model provided on the next page, describe in manhours and time required to complete each step of the process as it applies to your activity?

12. How much time, on the average, is spent on technical data research?

13. Where/how does your organization currently obtain technical data. (List methods/sources).

14. If an on-line terminal were/is available at your activity to provide an automated research capability, have you actually gained or foresee any savings in time, efficiency, space, improved productivity, and manpower? (If possible, provide data to support opinion.)

15. If a real-time system were available, how would you like the data formatted on the screen? (i.e. part number, NSN, drawing number, next higher assembly, etc.)

16. How would the availability of automated technical data be integrated into your current operation? Do you see value in having technical data available to both technical and contracting branches? Explain.

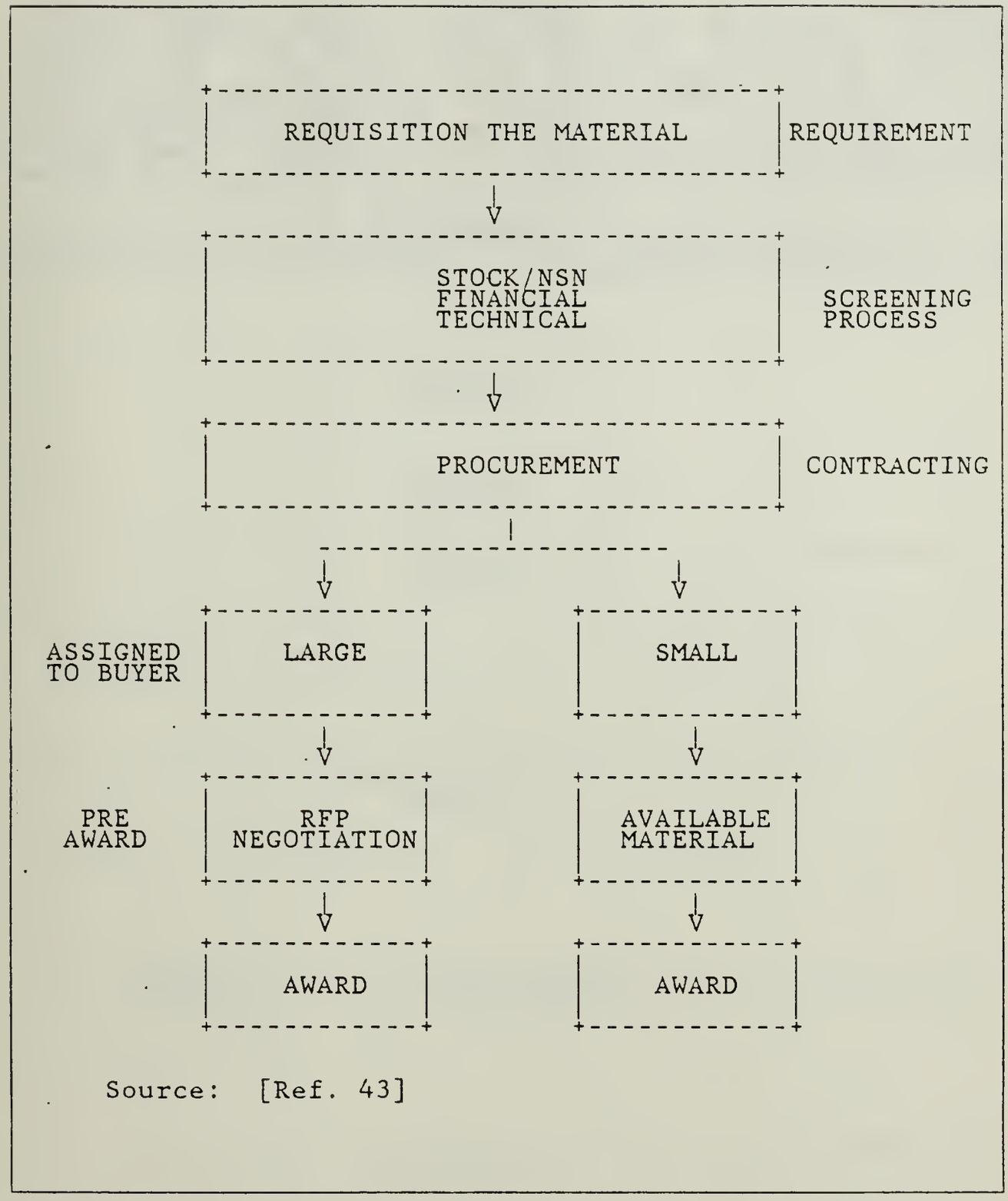

Figure B.1 Navy Field Contracting Model.

17. The model we are proposing in our thesis is presented on the last page. Under the concept, requirements are forwarded by the customer to the procuring activity. After screening for standard stock/NSN and financial review, the

requisition enters a technical screen. If technical personnel had an on-line, real-time retrieval system such as EDMICS, we project that resources can be more effectively utilized and the procurement cycle shortened. A Contracts division having access to the same data base could also use it to resolve contract/technical questions throughout the procurement cycle. Please review this model and comment on its strengths and weaknesses. Additionally, comments are requested on what other benefits or uses you see in having an automated data base available in the Contracts division.

18. Do you desire a copy of the findings of this survey? If yes, provide an address and our findings will be forwarded upon completion of research.

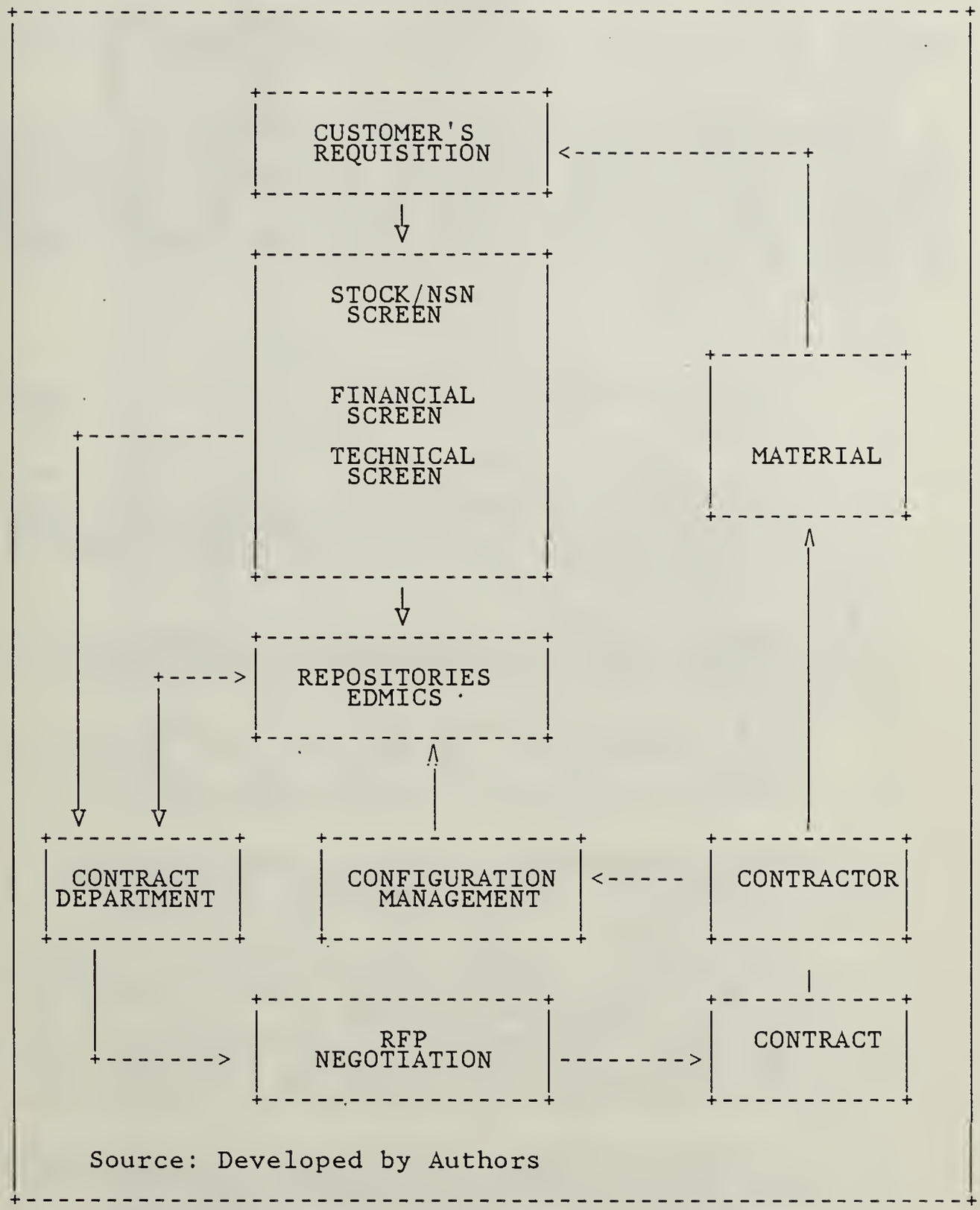

Figure B.2 APADE - EDMIC Contracting Model.

APPENDIX C

PROJECT BUY OUR SPARES SMART (BOSS) STATUS REPORT FOR FY 84

Congress has mandated that all military services provide an annual report within one year of the 1984 Authorization Act on status achieved to improve the procurement process. The following is a summary of SECDEF initiatives and Navy action taken to correct deficiencies. Information was obtained from the Navy's first annual report to Congress entitled "PROJECT BOSS (BUY OUR SPARES SMART) ANNUAL REPORT" of 21 March 1985.

1. SECDEF INITIATIVE: Provide incentives to those employees who pursue competition and cost savings.

   NAVY ACTION: During FY 84, 201 people were recognized for actions which led to competition--116 people received monetary awards totaling $22,383, with 85 receiving other forms of recognition. Over $13.6 million was saved in cost avoidances.

2. SECDEF INITIATIVE: Take disciplinary action against those employees who are negligent in implementing procedures which promote competition.

   NAVY ACTION: Established goals and objectives in Basic Performance Appraisals and Merit Pay programs which set goals for procurement personnel to achieve towards competition.

3. SECDEF INITIATIVE: Educate contractors to the seriousness of the problem and the government's intention to pursue competition vigorously.

   NAVY ACTION: Over 4500 small businessmen in thirty-nine Congressional districts attended presentations by Navy officers who described how to do business with the Navy. It was emphasized that the government intends to pay only a fair and reasonable price for goods and services provided. Approximately 6000 line items have been identified by industry as breakout candidates, with an annual buy value of $129 million.

4. SECDEF INITIATIVE: Competition advocates are to challenge all sole source orders, including those that appear to be excessively priced.

   NAVY ACTION: Over 150 commands had Competition Advocates assigned in FY 84. An additional 228 procurement personnel were added to improve

competition and pricing. ASO and SPCC increased competition by over one hundred percent.

5. SECDEF INITIATIVE: Refuse to pay unjustified price increases.

NAVY ACTION: (1) A Navy Pricing Hot Line was set up to accept telephone calls from Navy customers who thought certain items may be overpriced. (2) A Price Fighter team performed value analysis on parts to assist Navy negotiators establish a baseline price for contract negotiations. Over $504 thousand was saved in cost avoidance. (3) "Out of Tolerance" listings of large price changes were reviewed and refunds requested where the Navy paid too much for the item. (4) Contracting Officers who purchase centrally managed items certified in writing that prices paid in excess of 25 percent are reasonable. (5) Price awareness programs lead to better research of specifications, which lead to refunds, new sources of supply and more

6. SECDEF INITIATIVE: Accelerate the reform of basic contract procedures.

NAVY ACTION: (1) Overhead must not be allocated in accordance with value of the material and not spread equally across all line items in the buy. Multi-year procurement, with the integration of spares buys saved $15.9 million in cost avoidance in FY 84. (2) The "most favored customer" clause was used to ensure that the Navy pays no more for commercial items than the lowest price granted to commercial customers. (3) Redeterminable Basic Ordering Agreements (BOA) has been discontinued. (4) A contractor must indicate in the contract whether parts were manufactured, assembled, bought or tested in his/her company.

7. SECDEF INITIATIVE: Obtain refunds where the government has been overcharged.

NAVY ACTION: A total of twenty-seven parts were identified by the Pricing Hot Line, PRICE FIGHTER, audits and other pricing reviews totaling $554,390 refunded as of September 1984.

8. SECDEF INITIATIVE: Continue audits and investigations into spare parts procurement practices

NAVY ACTION: In addition to periodic Contract Management Reviews, Navy activities are also audited by the Naval Audit Service, DOD Inspector General, and several other investigative bodies.

9. SECDEF INITIATIVE: Take action against contractors and employees who are negligent in performing their duties or are engaging in excessive pricing practices.

NAVY ACTION: Project BOSS allocated resources to oversee a Navy-wide program to investigate and correct spare parts pricing discrepencies.

10. SECDEF INITIATIVE: Provide resources to induce desirable breakout, effective competitive procurement and improved pricing in the acquisition of spare parts.

NAVY ACTION: The Navy allocated $35.8 million and 604 end strength to Project BOSS in FY 84, with an additional 185 end strength and a total of $67.4 million applied in FY 85 programs.

11. SECDEF INITIATIVE: Apply the DOD Parts Control Program to enhance competition.

NAVY ACTION: Navy and Marine Corps directives implement parts control as a mandatory program in accordance with DOD guidance. A total of eighty-two new contracts were submitted for review in CY 84, 8 percent over CY 83.

12. SECDEF INITIATIVE: Accelerate plans for acquisition of computer hardware and software to assist parts control personnel.

NAVY ACTION: (1) The Automated Procurement and Accounting Data Entry (APADE) system is expected to be prototyped within eighteen months to assist the buyer of spare parts with a better procurement information. (2) The Navy Print On Demand System (NPOD) will store military specifications and standards in an automated fashion at the Publications and Forms Center. Customer requirements will be printed for use much faster than is possible under a manual operation. (3) The Engineering Data Management and Information Control System (EDMICS) will automate data repositories and provide parts control personnel with computer terminals necessary to issue on-line requests for engineering documents.

13. SECDEF INITIATIVE: Identify disparities in spare parts prices within and among various procuring activities.

NAVY ACTION: (1) The Pricing Hot Line resulted in decreases to the Management List- Navy (Navy price list) of 579 line items. (2) Programs have been implemented to compare standard stock items procured locally by two or more contracting sites. It compares prices paid for the same item and provides information to the Management List-Navy with new average prices for stock numbered items procured in the field.

14. SECDEF INITIATIVE: Employ value engineering to investigate spare parts where cost exceeds intrinsic value.

NAVY ACTION: (1) All contracts for spare parts which exceed $25,000 contain a value engineering clause to encourage contractors to submit Value Engineering Proposals. (2) A "should cost" analyses on spare parts was instituted by the formation of the Price Fighter team, which is comprised of engineers, equipment specialists and pricing specialists.

15. SECDEF INITIATIVE: Assign more engineering resources to review new procurement data packages for accuracy.

NAVY ACTION: (1) Navy engineering and technical personnel ensure that correct and complete data is procured under system acquisition programs, review acquisition plans prior to procurement to be sure that data requirements are properly specified, and technical data is reviewed at point of delivery to determine its completeness and accuracy. (2) Approximately 250 new end strength were added to the Breakout program, which resulted in full screens of 5189 items and over 100,000 limited screens.

16. SECDEF INITIATIVE: Make breakout of spare parts a factor in source selection for new major weapons systems. Develop incentive arrangements to reward contractors for cost savings generated by their efforts.

NAVY ACTION: This initiative is included under the "Model Concept" program currently being developed by the Office of the Secretary of Defense. The Navy CV Helicopter and High Frequency Anti-Jam (HFAJ) programs are candidates for this program.

17. SECDEF INITIATIVE: Negotiate contract data provisions which reduce contractors' proprietary rights in data.

NAVY ACTION: (1) Interim implementation guidance has been forwarded to major contracting activities via a DOD Federal Acquisition Regulation Supplement. (2) A program to challenge proprietary data restrictions was established with over 600 informal "letters of persuasion" sent to contractors challenging proprietary legends. Legends have been removed on items with an annual buy value of $12.7 million.

18. SECDEF INITIATIVE: Designate acquisition of spare parts and reprocurement data as an agenda item in Acquisition Strategy Panels, Advance Acquistion Plans, and Acquisition Review Councils.

NAVY ACTION: Defense System Acquisition Review Councils and Logistics Review Group sessions review both spare parts acquisition policy and reprocurement policy on a regular basis.

19. SECDEF INITIATIVE: Revise performance evaluation factors for acquisition and logistics managers. Include emphasis on spare parts pricing, breakout, competition, and value engineering accomplishments.

NAVY ACTION: Performance evaluations now include competition, pricing, breakout and value engineering goals and objectives for those personnel involved in spare parts acquisitions.

20. SECDEF INITIATIVE: Implement DAR Supplement No. 6.

NAVY ACTION DAR Supplement No. 6, which provides specific guidance on breakout policies was issued and has resulted in 5189 parts screened by Navy activities. It resulted in 3431 (66 percent) of the items were successfully broken out.

21. SECDEF INITIATIVE: Consider in all contracts, as appropriate, the government's right and ability to breakout and procure competitively spare parts.

NAVY ACTION: See paragraph 17 above in this section.

22. SECDEF INITIATIVE: Discourage use of government specifications and contractor proposed engineering designs that inhibit subsequent competitive procurement of spare parts.

NAVY ACTION: Challenges to specifications and requirements have produced cost avoidances of $9.5 million in FY 84.

23. SECDEF INITIATIVE: Continue action on SECDEF Ten Point program to insure that prices paid for all spare parts are fair and reasonable.

NAVY ACTION: Project BOSS supports all aspects of Secretary Weinberger's Ten Point program. NAVSUP PML-550 was established to coordinate Project BOSS.

24. SECDEF INITIATIVE: Pursue appropriate refunds or other recoupments recommended by any audit or disclosure of incorrect pricing or overcharge.

NAVY ACTION: See paragraph 7 above.

25. SECDEF INITIATIVE: Review existing contracts to fully address any and all opportunities for improved pricing of spare parts, including breakout and competition.

NAVY ACTION: See paragraphs 5, 8, 14, and 15 for compliance.

26. SECDEF INITIATIVE: Instruct acquisition personnel to challenge any procurement action for spare parts where the estimated or negotiated price appears unrelated to intrinsic value.

NAVY ACTION: Most spare parts procured by the Navy are bought by the Inventory Control Points (ICP). The "out of tolerance" programs to identify price increases which exceed specified parameters through the use of value engineering and Price Fighter have contributed to this initiative. See paragraphs 5 and 15.

27. SECDEF INITIATIVE: Reexamine policy on patent and data rights arising under government funded IR&D.

NAVY ACTION: The Navy has determined this program to be adequate after a review of current policy.

28. SECDEF INITIATIVE: Expand training curricula to ensure emphasis, understanding, and technical skill level for all procurement personnel.

NAVY ACTION: (1) Value engineering courses have been provided to procurement and technical personnel. (2) The Naval Investigative Service held training for Contract Management Review teams and inventory control point internal review personnel in contract fraud detection techniques. (3) Additional courses such as Cost/price analysis, Full and limited screen breakout, Second Sourcing, Federal Acquisition Regulations, and Proprietary data were provided to procurement personnel.

29. SECDEF INITIATIVE: Assign special task forces to review existing reprocurement data packages for spare parts with high annual buy values.

NAVY ACTION: See paragraphs 8 and 16 above.

30. SECDEF INITIATIVE: Evaluate and make recommendations for changes to existing authorization, appropriation, apportionment, and budgeting and financial management practices and regulations pertaining to acquisition of spare parts.

NAVY ACTION: On 1 April 1981, non-aviation Depot Level Repairable (DLRs) were changed from appropriated accounts to the Navy Stock Fund (NSF). Then on 1 April 1985, aviation DLRs were also converted to the Navy Stock Fund. There were many reasons for the transition: (1) Improvement in material availability (2) Procurement requirement visibility is more accurate under NSF because budgets are developed/justified two years closer to execution than in the appropriated accounts. The NSF also allows prudent tradeoffs between procurement and repair decisions (3) A buyer/seller relationship is established between the customer who must now expedite the return of assets for repair and generates an increased awareness of spare parts.

31. SECDEF INITIATIVE: Pursue with appropriate Congressional committees and their staffs the merits of two-year authorization for acquisition of replenishment spare parts and consumables.

NAVY ACTION: This item is being pursued by the Office of the Secretary of Defense.

32. SECDEF INITIATIVE: Insist on contract terms and conditions in all future acquisitions that afford more equitable treatment and provide for greater assurance of fair and reasonable prices.

NAVY ACTION: (1) The equal overhead allocation methodology has been eliminated. (2) A "most favored customer" clause has been placed in contracts to ensure that the government's price for commercial items is equal to or better than a vendor's best non-government customer. (3) Clauses to improve the government's rights to proprietary data have been promulgated. (4) The value engineering clause is only included in contracts over $25,000 (5) A new clause requires contractors submitting bids to indicate whether items are manufactured, assembled, bought, or tested by that same contractor. (6) All documents or solicitations for spare parts requirements include the following admonition: "Caution to offerers: No contract will be awarded under this solicitation at greater than fair and reasonable prices."

33. SECDEF INITIATIVE: Automate data repositories to improve the acquisition, storage, update, and retrieval of reprocurement technical data.

NAVY ACTION: See paragraph 13 above. EDMICS will be installed to automate engineerings drawings for access by logistics personnel. Data repositories will be automated for on-line access to data.

34. SECDEF INITIATIVE: Evaluate and assess accomplishments under near and mid-term actions for additional policy direction, as appropriate.

NAVY ACTION: In FY 84 cost avoidances of nearly $200 million were achieved, less $35.1 million to establish and execute the Project BOSS program. Table I provides a summary of the Cost Avoidances for Project BOSS.

APPENDIX D

DOD ENGINEERING DATA REPOSITORIES, MIL-HDBK-331C OF 19 AUGUST 1983

Navy Engineering Data Repositories

Naval Air Systems Command Repositories

Naval Air Technical Services Facility (NATSF)
Philadelphia, Pa.

Data Contained: Airframes, Power Plants, Airborne Equipment such as instruments, communications and navigation equipment; Test sets, GSE, Maintenance and Repair Equipment; Components and Launchers for Bullpup, Sparrow, and Regulus Missiles; Airborne Ordnance Equipment.

Naval Sea Systems Command Repositories

Commanding Officer Naval Ordnance Station
Naval Engineering Drawing Support Activity
Louisville, Kentucky

Data Contained: Ordnance equipment such as as guns, gun mounts, small arms, launching devices, depth charges, mines, ammunition handling equipment, fire control equipment, test equipment for ordnance items, reusable ordnance containers, and torpedo related ordnance.

Commanding Officer
Naval Ship Weapons Systems Engineering Station
Naval Engineering Drawing Support Activity
Port Hueneme, Ca.

Data Contained: Engineering drawings for surface missile systems; includes data/drawings for missile components, engines, warheads, launchers, fire control equipment, weapons direction equipment, and miscellaneous tooling.

Commander
Portsmouth Naval Shipyard
Naval Engineering Drawing Support Activity

Data Contained: Hull, Mechanical, and Electrical (ships drawings), Motor Rewind Data; Navigation and Interior Communications; Minesweeping Ship drawings; Salvage equipment; Electronic Warfare, Radar, Submarine Antenna and Degaussing Equipment.

Commanding Officer
Naval Sea Systems Engineering Station
Norfolk, Va.

Data Contained: Surface and submarine sonar equipment drawings; Shipboard electronics installation drawings.

Naval Facilities Command

Commander
Naval Facilities Engineering Command
Alexandria, Va

Data Contained: Design Manual-Drawings and Specifications.

Commanding Officer
Naval Construction Battalion Center
Port Hueneme, Ca

Data Contained: Drawings for naval stations, bases, centers, air stations and other activities; Includes breakwaters, hospitals, and piers; Includes civil, structural, electrical and mechanical material.

Commander
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Va

Commander
Chesapeake Division
Washington Navy Yard
Washington, D.C.

Commander
Northern Division
Philadelphia, Pa

Commander
Southern Division
Charleston, South Carolina

Officer In Charge of Construction
Contract Mid-Pacific
FPO San Francisco, Ca

Commanding Officer
Western Division
San Bruno, Ca

Naval Electronics Systems Command

Commander
Naval Electronics Systems Command
Washington, D.C.

Data Contained: Electronics equipment except shipboard, aircraft or weapons system related; Electronics communications systems and equipment for both ship and shore installations; Includes antennas, transmitters, receivers, recorders, etc. Includes U.S. Marine Corps tactical communication equipment.

Director
Naval Research Laboratory
Washington, D.C.

Data Contained: Mechanical Engineering Drawings for laboratory equipment and experimental apparatus.

Commanding Officer and Director
Naval Training Equipment Center (NTEC)
Orlando, Fl

Data Contained: Not available

Commanding Officer
Navy Ships Parts Control Center
Ammunition Division
Mechanicsburg, Pa

Data Contained: Nuclear ordnance items and related documents.

Marine Corps Engineering Data Repository

Commanding General
Technical Operations Division
Marine Corps Base
Albany, Ga

Data Contained: Small arms; communications equipment; calibration test equipment; PSE, GSE: Landing Craft Vehicles; Tactical Data Systems; Amphibious Assault Bulk Fuel.

Air Force Repositories

Eight repositories (centralized and decentralized by commodity)

Army Repositories

Sixteen decentralized repositories. Data stored by commodity.

Defense Logistics Agency Repositories

Nine decentralized repositories. Data stored by commodity.

Defense Nuclear Agency Repository

One centralized repository for data storage.

APPENDIX E

FUNCTIONAL BASES LINE COMPARISON BETWEEN APADE AND BCAS

APADE	BCAS
A. FUNCTIONS BY SUBSYSTEM	
I. Requisition Entry	I. Requisition Entry
A. Support 1348, NAVCOMP 2276, DD1149, JML 1348-6	A. Will be data link to customers. MILSTRIP compatible. Handles 15 digit requisitions.
B. Supports both single and multiple line requisitions.	B. For automated customers, line item numbers are systematically assigned and consolidated by stock class, service code and Branch/Section Person code. An individual PR record must be created for each line item on manual PR.
C. Capability to enter either single or group requisitions.	C. Holdover file consolidates.
D. Capability to enter requisition in an automated or manual mode from the UADPS-SP. Interface between UADPS is in a batch mode or through SPLICE.	D. Requisitions enter manually and in automated mode by automated customers.
E. Generates automated IDTC delivery orders without user intervention.	E. Automated Delivery Orders(ADO) if source and known price. Produces D.O. which is ready for signature.
	1. Automated purchase order capability (APO). If under competitive threshold and 90 days after previous orders, issue P.O. at the same price to previous suppliers.

F. Minimum keystrokes reentry through

1. Optional input error files
2. Key data fields repeated for grouped and/or multiple line requisitions
3. System assigned numbers

G. Validates entries/checks for duplicates, range value, inter-relational, required fields.

H. Generates PR Data Sheet with buyer info, contains:

1. Accounting data - either unique or retrieved from an on-line accounting file based on fund code and UIC or unique accounting data prints accounting line, funds amounts and expiration date.

2. Buyer code which is assigned automatically based on user specified criteria or assigned manually.

3. A listing of recommended sources based on commodity and/or price history from on-line file and advise as to the availability of IDTCs, BOAs, BPAs with those sources.

F. Will assign date in purchase when BCAS is data linked to customers.

G. Validates - checks for duplicate requisitions, if valid already under order. Interrelational-Compatibility checks.

H. Purchase Request Data Sheet

1. Accounting and financial integrated with customer funded purchase request in committed stage.

2. Buyer code assigned automatically based on commodity.

3. On repetitive buys, last successful bidder, successful vendor prior to last buy sent to the source file by commodity and automatically select the next source on the list. If $500, selects next three sources. If identified as having multiple small business sources, skips over large businesses in source file and selects next small business in line and rotates the file. Item record is annotated with control codes that

	identify it as an item that is on an IDTC (i.e. GSA-FSS) so that the computer prepares an automatic delivery order
4. Recommend consolidations with work-in-process.	4. Uses a file to hold incoming routine requirements for 0-9 days and consolidates like requirements.
5. Price history for the item requisitioned as well as any known interchangeable items.	5. Price history includes: when was last time item brought, vendor, priority for individual past procurement.
6. Known interchangeable items.	6. No.
7. Purchase item description (PID) - either unique or a standard PID from on-line files. Standard PIDs are printed for any known interchangeable items.	7. No.
8. System assigned Purchase Request Number	8. Track by reqn number.
9. Shipping address from on-line files or a unique address.	9. Shipping address from file. Ship to constant data base.
J. Capability to assign a buyer in an automated or manual mode. Automatically assigned based on user specified criteria.	
II. BUYER SUPPORT	II. BUYER SUPPORT
A. Supplemental Action	A. Supplemental Action
1. Splitting and recombining in one transaction a. Reqn from PR's b. Reqn lines from Reqns c. Quantities from Reqn	1. When award being processed.

lines	
2. Combining PR's	2. When award being processed.
3. Modifying a. REQN data entered b. PID c. Consignee d. Accounting - single or multiple line.	3. Modifying a. Customer processes YC b. Customer processes YC
4. Cancellation - PR's, Reqn, requisition lines a. Automated via UADPS or SYMIS Interface b. Manual.	4. MILSTRIP AC1 Cancellation requests. Buyer send LCC cancellation action to customer.
5. Preaward Milestone Tracking a. 24 user established "preset" plans b. One flexible plan c. Ability to design individual plan d. Ability to update and revise. e. Maximized use of SDA.	5. No.
6. Records and Generation referals. a. Issue/receipt recording b. Referal document production c. SYMIS Interface	6. No.
7. D&F and RAN recording and generation	7. No.
B. Purchase Action	B. Purchase Action
1. RFQ's generated and recorded a. Semi-automatically produced through default codes. User establishes default codes. User requisition entry or capability to modify and update requisition file.	1. Generates RFQ. Assigns RFQ number.

b. Transaction can be used for large dollar informal solicitation.	
c. Maximizes SDA by use of data repetition, optional error file storage and default codes.	
2. RQF mailing lists generated and recorded automatically solicits last successful offerer and any historical vendor who is eligible.	2. RFQ mailing list generated and recorded automatically selects last successful offerer and successful vendor prior to last buy.
3. RFQ responses recorded records only positive responses.	3. Automated production of a printed abstract and schedules. Records 3 consecutive non-responses.
4. Small purchase award documents generated and recorded.	4. Taps paper matrix printer creates forms. (Doesn't use pre-printe d forms.)
a. Unilateral and bilateral purchase orders	a. No
b. BPA calls - print is an option.	b. No
c. Imprest Fund actions recorded.	c. No
d. Award interfaces by product of processing on-line via SPLICE or in batch mode. 1. UADPS-SP financial and supply 2. IDA/IIA and IDA/IIB 3. SYMIS/MM 4. MILSCAP	d. No
e. Maximized use of SDA through optional error file storage, and data repetition.	e. No
f. Management data and price history information captured and stored as a by-product of processing.	f. Word processing and data processing interact

5. Large purchase PIN's, solicitations (IFB, RFP) a. operates in the same manner as small purchase solicitations with additional capabilities: (1) Automatically includes clauses based on type of contract. (2) SYMIS/MM interface (3) Synopsis is a by product of processing.	5. Of 4.4 million actions/ years, 2% of actions exceed small purchase threshold. a. no
6. Mailing lists generated from a rotating bid list IAW FAR a. All types of set asides b. Size of vendor list is determined on a case by case basis c. Automatically solicits last successful offerer and any historical offerors d. Excludes debarred, ineligible or suspended contractors e. Inactivates contractors who do not respond two consecutive times f. Generates dummy FSCM's for contractors who do not have FSCM's and updates the FSCM file g. Includes pro rata share of 6 business categories h. Automatically solicits any new contractors i. Generates SF 129's	6. No
7. Records responses to solicitations and PIN's a. Records negative and positive responses b. Records abstract information and generates abstracts	7. No abstracting module
8. Generates and records	8. No.

amendments to solicitations	
9. Generates and records sealed bid awards, negotiated awards, negotiated agreement (recognizes date logic) and delivery orders, regardless of dollar value, against IDTC's, GSA's and GSA/FSS schedules a. Maximized use of SDA through use of on-line files, data repetition, error file storage, on-line IDTC contract files. b. Interfaces are by-product (1) IDA/IIA, IDA/IIB computers (2) UADPS-SP Financial and Supply (3) SYMIS/MM (4) MILSCAP c. DD350, CHINFO releases, Synopsis are a by-product d. Captures management data and price history data as a by product of processing	9. Total contract writing system - word processor. a. No b. Interfaces with base which supports Standard Base Supply System, Medical Material Management System and direct inquires into BCAS by customer. c. DD350 info required before award can be processed
10. Contract Administration Post Award Milestones Post Award Referrals	10. Post Award Milestones
11. File Maintenance	11. Supports loading, changing, and deletion of basic records within system.
12. Reports	12. All reports required by DOD. Can get any management reports requested as long as info on data base.
13. Real time inquiry.	13. Real time inquiry.

[Ref. &STUDY: Appendix D]

APPENDIX F

TASKS REQUIRING ENGINEERING DRAWINGS

1. Competitive breakout reviews
2. Processing of stratification
3. Resolving purchase/contract problems
4. Maintaining configuration control such as item interchangeability
5. File maintenance
6. Quality assurance
7. Engineering review and analysis
8. Processing requests for engineering support submitted by outside activities
9. Processing unsolicited proposals
10. Packaging evaluation
11. Assignment of DEMIL codes
12. Item Management Coding (IMC)
13. Standardization
14. Assignment of Source Maintenance and Recoverability Codes (SM&R)
15. Processing COG changes
16. Research of part number buys
17. Shelf life determinations
18. Special material content coding
19. Cataloging actions
20. Assigning item descriptions
21. Processing PICA/SICA
22. Initiating supply support requests
23. Review of design change notices
24. Review of supply item change records
25. Determination of test requirements

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